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J. LEE NICHOLSON INSTITUTE
OF
COST ACCOUNTING

STANDARD BASIC COURSE

ADMONITORY ADDRESS
AND
FIRST LESSON

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GIFT

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STANDARD BASIC COURSE

Addenda

Students are requested to note the following corrections of typographical errors, and explanations which affect Lessons No. 5, 6, 8, 10, 11, 15, 22, 23, 26, 27 and 28.

Fifth Lesson

Labor Piece Work Report, Page 7.—The amount shown as \$2.50 should be \$2.25.

Answers—Sixth Examination

Paragraph 3, Page 9.—"Indirect" should be "direct."

Questions—Eighth Examination

Material Requisitions, Page 5.—

No. 2.—250 tons should be 300 tons.

No. 4.—Add to the requisition, Joints, Plates and Spikes, cost \$160.00.

Answers—Tenth Examination

Billing Record, Page 9.—Total \$466.00 should be \$446.00.

Eleventh Examination—Ledger Accounts, Page 17

Amounts Payable.—The opening credit balance should be dated Jan. 1.

Fifteenth Lesson

Problem No. 2, Page 4.—"The following production is reported during the cost period," should have appeared as "The following charges and production were reported during the cost period."

The explanation under Defective Work should read: "Defective work of Dept. B was corrected by Dept. A. It is to bear its proportion of overhead, and the total cost is to appear upon the ledger as "Defective work—Dept. B," and thus reported upon the ending trial balance.

The productive labor hours for Dept. A, product No. 1, shown as 84583, should be 84853, and the total productive hours when added should be 122,630 instead of 122,360.

Twenty-Second Lesson—Explanation

Profit and Loss Statement, Page 10.—Freight and Cartage Outward, \$232.50, should appear as a selling expense.

Problem No. 2.

Expenditures, Page 5.—

Labor in yard.....	\$ 300.00
Labor delivering to yard.....	510.00
Labor delivering sales.....	1050.00

Expenditures, Page 6.—

Garage labor.....	\$ 200.00
Truck repairs.....	320.00
Depreciation of equipment.....	150.00
Truck supplies used.....	480.00

It is not the object of the problem to distribute the expenditures to purchases or sales. For this purpose additional details would be required. The expenditures are to appear in the profit and loss statement as "Yard and Transportation Expenses."

Twenty-Third Lesson—Explanation

Page 6, The Expenditures.—"Selling Expenses," \$3,000.00, and "Administrative Expenses," \$2,000.00, are to be considered as part of the estimated cost for overhead. They are to be distributed to the Sales Classifications on the basis of the percentage of the cost of each Sales Classification to the total cost of all Sales Classifications, per your statement of cost of sales.

Twenty-Sixth Lesson—Explanation

Page 6.—In addition to the six statements required from the student, Journal entries and Ledger accounts are also to be submitted.

Page 12, Ledger Account No. 9.—Disregard the price (cost of sales), 3.1878.
Ledger Account No. 10.—Disregard the price (cost of sales), 5.6556. The unit prices are not essential.

Page 11, Ledger Account No. 7.—Disregard the price (cost of sales), 3.3865.

Twenty-Seventh and Twenty-Eighth Lessons—Explanation

Weaving Department.—The charges during the period—excluding material—amounted to \$52,805.48.

The running time of the machines was 18,000 hours, and, as the charges amounted to \$52,805.48, an hourly rate of \$2.9336 was established.

Apparently, there was work in process at January 1, 1919, which was not properly considered when the Inventory was taken. This class of error (liable to occur in actual practice) should be carefully guarded against. The reports from the weaving department showed 18,100 machine hours on production; therefore, crediting production on the latter basis slightly overcredits the department, due to the fact that the department was not charged with a correct amount for the beginning Inventory.

The conditions and solution of the problem clearly show the care necessary in order to avoid the class of error above referred to.

Page 17, Account No. 29.—As "Sunday Expenses" should be "Sundry Expenses."

ADMONITORY ADDRESS TO THE STUDENT:

The principles which govern Cost Accounting form the foundation upon which the superstructure—accounting for costs—is reared. If knowledge of the principles is defective, the superstructure reared thereon will be endangered.

The principles may appear, at first sight, to be very elementary, and the Student may be inclined to give them superficial consideration only. As the Student progresses, he will perceive that matters which were apparently elementary are actually complex, we, therefore, caution the Student against superficial study of any subject entering into the course.

Answers to questions, and the solutions of problems require the most careful and thorough study before they are sent to us. We shall assume they represent the Student's best efforts.

Avoid hasty and inconsiderate methods, and characterize your work by displaying a reasonable amount of neatness.

As soon as you have completed a lesson, including answers to questions, and solutions of problems, forward the answers and solutions to us. Do not allow them to accumulate at your end of the line.

Answers to examination questions, and solutions of problems are to be written with ink—or writing machine—upon the blank paper you will receive with each lesson, both sides of the sheets being used. Pencil your drafts on ordinary paper before finally preparing the sheets which are to be sent to us. Retain your pencilled drafts for comparison with the answers and solutions which will accompany each succeeding lesson.

Each sheet is to be headed "Answers to questions (or, Solution of Problem No.....) of the.....examination."

Each question is to be answered in numerical order, and each answer is to be prefixed by the number of the question.

The sheets are to be pinned together, the last sheet bearing the signature of the student, his address, and the date.

The instruction course is based upon a presentation, in the manner of a lecture, of each successive step which will develop the subject of cost accounting in a natural and related manner, supplemented by a series of questions designed to test the extent to which the Student has mastered each study. Collateral reading has been provided, by supplying the Student with a copy of "Cost Accounting" by J. Lee Nicholson, C. P. A. and J. F. D. Rohrbach, C. P. A. This is to be read, as part of each lesson, to the extent directed when each lesson is advised to the Student.

Competent cost accountants find it necessary to keep abreast of the times by accumulating a library of leading cost accounting literature. The Student cannot put his leisure to better purpose than by reading any of the following books on the subject of Costs:—

Dealing with Theory, Principles and Practice:

“Cost Accounts”—Hawkins.

“Principles of Factory Cost Keeping”—Moxey.

“Cost Accounting, Theory and Practice”—Nicholson.

Dealing with Indirect Expenses or Overhead:

“Expense Burden”—Church

For General Reading:

“Factory Organization and Administration”—Diemer.

“Bookkeeping and Cost Accounting for Factories”—Kent.

For Engineering Costs:

“Cost Keeping”—Gillette & Dana.

FIRST LESSON

SUBJECTS: COST ACCOUNTING, ELEMENTS OF COST.

(Collateral reading, Chapters 1 and 2.)

The subject is presented with considerable detail, in order that the Student may, at the outset, have an adequate conception of what is involved in studying it.

The Principal Purposes of Cost Accounting are:

- (a) To analyze and record the cost of factory expenditures, represented by materials, labor and expenses. This purpose relates to cost finding.
- (b) To so compile the costs as to show the total production cost of an order, job, article or process. This purpose relates to accounting for the costs, when found.

Efficiency, Developed by Cost Accounting:

The subject of efficiency is now one of the foremost considerations in business management. Its object is to secure maximum results with a minimum expenditure of time, labor and expense.

In cases where machinery is an important factor in factory production, efficiency must be considered from the view points of the cost accountant, and the efficiency engineer. The cost accountant deals with actual facts, as they have occurred. These facts he is able to present to the management in comparative form. The technical knowledge possessed by the management will enable the determination of any inefficiencies which may exist. Such a presentation of the facts is the object and office of the Cost Accountant.

The efficiency engineer deals with the results which may reasonably be expected from a proper utilization of the mechanical units which constitute a manufacturing plant.

Principal Advantages of a Cost System:

Cost accounting furnishes many bases which are of vital importance in guiding the management, and assisting executives in the determination of business policies.

The principal of such bases are:

A Perpetual Merchandise Inventory:

A perpetual merchandise inventory is an inventory shown to exist by the books of account, therefore, the inventory is ascertainable at any time when the accounts are completely posted, hence the term "perpetual inventory." It provides a check upon the accuracy of a physical inventory, that is, an inventory taken of merchandise on hand by actual inspection. It enables the preparation of financial and statistical statements monthly, or for a cost period, which otherwise could only be prepared at such time as a physical inventory was taken, usually once a year.

The financial statements referred to are a Balance Sheet, showing the financial condition of the business at the end of the month, or cost period, and a Manufacturing and profit and loss statement, showing the financial operations of each department of the factory, and of the business as a whole during the period.

A cost system also supplies information from which various statistical statements may be prepared. Costs properly classified, as to each article manufactured, and as to operations, departments and products, will provide details vitally important to the management.

The management must know the costs at each distinct stage of the business. Each department must be accurately informed of its production costs for each cost period, and it must be informed of any condition occurring elsewhere in the plant, in which it has an incidental interest. Harmonizing the relations existing between departments is one of the objects of a cost system.

All information—not of a purely financial character—relating to any manufacturing business, must be supplied by the cost department.

Financial statements are impossible until the factory costs have been coordinated with the general accounts of the business. Statistical statements are possible only from the Factory Costs.

The factory records supply all information necessary for employing the Working Capital of the business to the best advantage. The full import of the dependence placed upon a Cost System will be better understood by considering some of the objects gained.

Obsolete stocks, or excessive stocks may be brought to the attention of the Sales department, enabling the department to stimulate sales which will absorb such stocks.

In cases where raw materials are required in definitely pre-arranged minimum and maximum quantities, the purchasing department is constantly advised as to the quantity of such stocks on hand.

A factory may be engaged in producing several lines of standard product, some of which are satisfactorily profitable, whilst others may be less profitable, or may involve an actual loss. The factory costs will unerringly indicate the results from each such line, enabling the management and the sales department to concentrate their efforts upon the more profitable articles. This means greater efficiency in management and selling.

In every plant the possibility exists of losses occurring as the result of negligences and inefficient supervision. It is a duty of the cost department to bring such losses to light: Losses of materials, loss of time by operatives and machines in waiting for materials upon which to operate, or for necessary instructions, loss caused by substitutions of a better grade of material than is necessary, because the required grade was not on hand.

All matters which determine the policy to be pursued by the Executive branch of a manufacturing business are obtained from the cost department. Statistical statements would show the minimum price for which a product could be profitably sold. They would enable a comparison to be made between actual costs and standard, or estimated costs.

A comparison would also be possible as to the varying costs occurring under differing wage payment plans, that is, day work, piece work, differential piece rate, Premium, and Bonus plans. The comparison would extend to hand and machine work.

A comparison would also be possible between the factory cost and market cost of parts of the product. This comparison would indicate any part of the product which might be advantageously purchased in the open market.

If a properly conducted cost system exists, every activity of the factory is under its scrutiny. If the cost accountant competently interprets the information supplied by the system, he will be able to present it to the management in a form which will preclude the possibility of its significance being overlooked or misunderstood.

What we have said in the foregoing presentation of the subject—cost accounting—is merely an outline, our present purpose being to acquaint the student with the subject at the outset of his studies. The manner in which the various purposes of cost accounting are accomplished will be made evident during the progress of the course.

PRE-REQUISITES TO SUCCESS IN THE STUDY OF COST ACCOUNTING.

The Student must thoroughly master the principles which govern cost accounting. This is not a difficult matter, because the principles are absolutely unchangeable. They are applicable to any industry, irrespective of its character, or magnitude. The student must also thoroughly master the accounting requirements, for properly representing the principles in an accounting system.

The foregoing exposition of the subject—Cost Accounting—is not to be considered as covering every consideration that is applicable, it will, however, suffice for the accomplishment of our purpose, in presenting it, the purpose being to impress upon the Student a proper measure of its importance at the commencement of his studies.

We now proceed to an explanation of the elements which constitute manufacturing costs.

The Elements of Cost.

In every manufacturing industry, large or small, irrespective of what the manufactured product may be, the costs of production are represented by material, labor and expense. Each one of these elements is subject to subdivision, as being direct and indirect.

A direct element of cost is one which may be clearly identified with the product upon which it was used, and of which it becomes a part.

An indirect element of cost is one which enters into, or benefits the product in such a way as that its application to a definite part of the product (an order, job, article, or process) is not ascertainable, or, if it be ascertainable, an unreasonable expenditure of clerical effort would be required.

Direct Material Costs are represented by the Cost of the materials from which the product is made.

Direct Labor Costs are represented by the wages paid for labor specifically engaged upon the product.

Direct Expense Costs are represented by expenditures which are specifically assignable to a particular order, job, article or process.

An instance of direct expense is furnished in the case of workmen traveling to and from a job when engaged at a distance from the factory. The time taken in traveling, the transportation and hotel expenses, would constitute ex-

penses specifically chargeable to the job upon which they were engaged, the cost therefore would be a direct expense. The student will perceive that the illustration classifies the time of the workmen—when traveling—as an element of expense, notwithstanding the fact that the expense is represented by wages paid for the time so employed. It is an expense, as distinguished from a labor cost by reason of the fact that, when traveling, the workmen were not specifically engaged upon productive work.

Indirect Material Costs are represented by the cost of materials which cannot be indentified with a particular order, job, article or process. Examples of indirect materials are furnished in the use of oils, grease and waste, used for lubricating and cleaning machines, nails, and screws used in small quantities in making patterns, moulding sand used in a foundry.

Indirect Labor Costs are represented by wages paid for labor not specifically engaged upon the product—such as wages of factory superintendents, foreman or clerks, timekeepers, and general factory laborers. Whilst all are incidently engaged upon work connected with the factory, none work directly upon the product.

Indirect Expense Costs are Represented by expenditures not specifically assignable to a definite order, job, article or process, such as—Factory rent, insurance, taxes, depreciation, maintenance of buildings and machinery, light, heat, power, and miscellaneous factory expenses.

Factory costs terminate when the product of the factory is completed, therefore, the three elements of cost—materials, labor, and expense—must be confined to expenditures which directly, or indirectly relate to the product. All other expenditures will relate to the selling or administrative departments of the business.

From the foregoing explanation of the constituent elements of factory costs, the student will understand the cumulative relations which exist between the costs and the selling price of the product. The following shows the relations, and in much the same order in which a manufacturer applies costs as a means of determining selling price.

Assuming a direct material cost of \$3.20 a direct labor cost of \$2.90 indirect costs \$1.10, selling expense \$1.05, administrative expense \$1.14, and a profit of \$2.50, the cumulative relations between the costs and selling price may be expressed as follows:

Direct Material Cost.....	\$3.20
Direct Labor Cost.....	2.90
	<hr/>
Prime Cost.....	\$6.10
Indirect Costs.....	1.10
	<hr/>
Factory Cost.....	\$7.20
Selling expense ..	\$1.05
Adminst. Expense 1.14.....	2.19
	<hr/>
Total Cost.....	\$9.39
Profit	2.50
	<hr/>
Selling Price.....	<u>\$11.89</u>

QUESTIONS FORMING THE FIRST EXAMINATION.

The questions relate only to subjects, or divisions of subjects, covered by the presentation of cost accounting as the subject of the first lesson, together with chapters 1 and 2 of the collateral reading.

1. Cost accounting performs two distinct functions, one of which is direct, the other indirect.
Explain the direct function.
Explain the indirect function.
2. What accounting purposes are factory cost records limited to?
3. What are the distinguishing characteristics between the accounts shown by factory cost records, and the accounts shown by the general financial books of a manufacturing business?
4. Factory cost records must present a requisite degree of analysis, in order that their purpose may be fulfilled.
State, in a general way, the principal analytical requisites.
5. What is a perpetual inventory, and how is it shown to exist?
6. Explain the meaning of the term "Physical Inventory."
7. If a perpetual inventory is provided by a Cost accounting system, what financial statements would it be possible to prepare, and for what periods?
8. A detailed cost system establishes the Cost of each order, job, article, or process.
Explain four decided advantages which accrue to the management, from this service.
9. What useful purpose would be served by a cost system, for a manufacturing business in which the following conditions existed:
 - (a) Estimated costs are required in advance?
 - (b) Differing methods are in use with respect to manual and machine employment?
 - (c) Differing systems are in use for the payment of wages?
10. What are the distinguishing duties of a cost accountant as compared with the duties to be rendered by an efficiency engineer?
11. How would you classify the following items, connected with the product of a factory?
 - (a) Steel—Used in making the product.
 - (b) Labor—Engaged upon the product.
 - (c) Cost of a telegram to the customer, respecting changes in specifications, required in the manufacturing process.
12. How is an element of cost determined to be a direct cost?
13. Classify, and name the items of indirect costs which are usual to a manufacturing business, and briefly state the reason for each classification.
14. What is meant by the prime cost of a product?
15. Why are certain costs classed as indirect costs?
16. What are the constituent elements of factory cost?
17. Is a discount allowed to a customer, by way of a deduction from a sales invoice, a factory cost?

QUESTIONS FOR THE YEAR

The first question is: What is the purpose of the study?

1. The purpose of the study is to determine the effect of the treatment on the outcome.

2. The purpose of the study is to determine the effect of the treatment on the outcome.

3. The purpose of the study is to determine the effect of the treatment on the outcome.

4. The purpose of the study is to determine the effect of the treatment on the outcome.

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20. The purpose of the study is to determine the effect of the treatment on the outcome.

21. The purpose of the study is to determine the effect of the treatment on the outcome.

22. The purpose of the study is to determine the effect of the treatment on the outcome.

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STANDARD BASIC COURSE

SECOND LESSON

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SECOND LESSON

SUBJECTS PRESENTED: GENERAL METHODS OF COST FINDING —DEPARTMENTAL, AND PRODUCT CLASSIFICATIONS.

(Collateral reading chapters 3 and 4.)

GENERAL METHODS OF COST FINDING.

The term "Cost Finding," means the ascertaining of costs, and a "method of Cost Finding" refers to the means employed to accomplish that purpose.

All cost finding methods serve their purposes by collecting the costs at certain points or stages, during the progress of product through a factory. The question as to the most accurate means, by which the costs may be collected, must be decided by the Cost Accountant in each case where a cost system is to be employed.

The methods are governed by unalterable principles. If the principles are thoroughly understood, they will always indicate the cost finding method which should be employed, it is, therefore, of prime importance that the Student has a complete understanding of the principles, as now presented:

Requirements of Cost Finding Method, and the Principles Involved:

Accurate costs cannot be ascertained, by any method, until a system has been arranged for providing the following information:

- (a) A system must be devised for reporting the kind, quantity, and cost value of materials used in the product.
- (b) The system of reporting—above referred to—must also extend to the payments made for labor, and for indirect expenses (overhead) in connection with the product.
- (c) A system must be devised for collecting the information resulting from (a) and (b) above.
- (d) A system must be devised for expressing the information resulting from (c) above, as the total cost, which was to be found.

The manner in which the above stated requirements are provided for, will depend upon which of the two generally used methods of cost finding are to be employed. The two methods are designated as:

- (1) Special order method of cost finding.
- (2) Process method of cost finding.

The conditions which govern each method are as follows:

CONDITIONS WHICH GOVERN THE SPECIAL ORDER METHOD OF COST FINDING.

A "special order" is to be understood as an order for product which is not standard, or regularly made product of the factory, a special order would therefore involve special conditions for its manufacture. The special conditions of manufacture, here referred to, are the precise requisites for determining the systems which must be devised for ascertaining costs, set forth under (a)—(b)—(c) and (d) preceding.

The system of reporting the material, labor, and overhead costs, the collecting of the costs, and expressing the total cost, will relate to each special order separately. Tersely stated, the special order will at all times be under clear identification, as it is passing through the factory, as product.

CONDITIONS WHICH GOVERN THE PROCESS METHOD OF COST FINDING.

A "process" is to be understood as factory production of identical product, in a more or less continuous manner, the manufacturing conditions would therefore apply to the product as a whole, and the costs would also apply to the product as a whole, the cost of a unit of the product—expressed by count, weight, or measurement—being found by dividing the total cost by the number of units contained in the product.

The system of reporting the material, labor and overhead costs, the collecting of the costs, and expressing the cost, will relate to the entire product, the cost of an order for a part of the product being found by ascertaining the unit cost, as previously stated.

The Student will have perceived that an order for any part of a product which is manufactured under a process system may lose its identity in the process, and that the order is—in reality—for a specific quantity of the product which might be supplied from the finished stock room, if the requisite stock happened to be on hand.

With the foregoing distinguishing features of the special order and process methods of cost finding firmly in mind, the Student may proceed a step further, and learn that occasions often exist, in a factory, which necessitate the use of both systems of cost finding.

For instance, an order received by a metal working plant may include the making of castings, which are to be machined and turned out as finished machinery. Castings for other orders would probably be made from the same melt, therefore, the order in question would lose its identity in the melting and casting process. In this case, the cost of the entire casting process would be found to be a definite amount, per pound, of castings produced, the charge to be made against any particular order being the per pound rate multiplied by the number of pounds in the weight of the required casting. The remaining costs of the order in question would be collected directly against the order by the special order method of cost finding.

At this point, the attention of the Student may be appropriately directed to the possibility, which often exists, of curtailing clerical details by grouping like conditions when the special order method of cost finding is used.

For instance, if an order for 100 articles embraces two or more, which are identical as to material, style and finish, clerical effort will be saved by grouping the costs which relate to similar articles, the average cost of each article in a group being found by dividing the cost of each group by the number of articles included in the group.

The various forms, or reports, required for ascertaining and collecting costs will be the subject of a lesson in its appropriate course.

DEPARTMENTAL AND PRODUCT CLASSIFICATIONS.

Classification of the departments of a factory includes a classification of distinctive operations. In this connection, an operation is classed as a depart-

ment, it is therefore not an uncommon occurrence for several operating departments to be encompassed within the larger department of which they are a part.

The object of classifying departments and product, is to establish the distinctive, and naturally separate, activities of a factory, and the differing character of its product. By this means, costs (particularly indirect, or overhead costs) may be directed against a department, operation, or process, with absolute precision, which otherwise would have to be classed as general factory operating expenses, and therefore distributed over the product arbitrarily.

Classifications of departments also serve the important purpose of enabling proof to be made of the cost figures which apply to each department.

A large factory will, as a rule, envelope the following distinct departments:

Receiving department, store room departments, purchasing department, production department, manufacturing departments, sales department, shipping department, cost department, and executive department.

The departments are subject to further classification as "productive departments," that is, departments engaged directly in producing the factory product, or "non-productive departments," that is, departments which although concerned exclusively with factory work—are not specifically engaged upon the product, such as the store room, purchasing, sales, and shipping departments, or "miscellaneous departments," that is, departments which are in part productive and non-productive, such as the Carpenter's Shop in an iron working industry, which, when engaged in preparing lumber for patterns to be charged as part of the cost of an order, or job, is productively employed, and when it is preparing lumber for maintenance and repairs it is unproductively employed.

The following summary will enable the Student to perceive, at a glance, the prime classifications of factory departments, which may be sub-classified to any extent which particular conditions require:

Productive Departments:

Departments engaged directly upon the factory product.

Non-productive Departments:

Departments engaged upon work of the factory, but not directly upon the product.

Miscellaneous Departments:

Departments partly engaged upon the product, and partly upon work of the factory which is not directly upon the product.

The product of the factory is chargeable with the aggregate of these department costs, after deducting therefrom costs which are applicable as betterments of the plant, which do not enter into the manufacturing statement.

PRODUCT CLASSIFICATIONS.

A classification of products is necessary in order that the costs of various products may be separately ascertained. As previously stated, one important object of a cost system is to determine the cost of a particular product in order that the manufacturer may know the relative profitableness of each line of product upon which his factory is engaged. Classifications of the products enables the gathering of the costs of each product, just as classifications

of departments enables the gathering of department costs. The object to be accomplished is the same in both cases, although the methods may vary.

The products of a factory usually comprise:

Standard product, that is, product for which there is a demand—more or less constant—in the open market.

Special product, that is, product manufactured to special order.

Product purchased for sale, that is, product not manufactured in the factory, but occasionally required to meet the demands of customers.

When the above stated conditions, or any two of them represent the business of a manufacturer, it is necessary that he should know the profits derived from each class of product. This information is possible only by classifying the products.

The service to be rendered by classification and a separate statement of profit for each product, will perhaps be better understood if we consider a business engaged upon the three lines of product stated above. Suppose the following to be the case. Classifications do not exist, and at the end of a definite period, a month, quarter, half year, or year, the manufacturing statement shows a gross profit (covering all three products) of \$20,000.00.

This result may appear to be satisfactory, but, as a matter of actual fact, had the three products been classified, and the manufacturing results separately stated, the results might have been as follows:

Gross profit from Standard product	\$30,000.00
Gross profit from product purchased for sale.	1,000.00
	<hr/>
	\$31,000.00
Manufacturing loss on Special product.....	11,000.00
	<hr/>
Gross profit from all products	\$20,000.00

The above stated exhibit would bring into prominence the fact that the profits from the Standard product of the factory were covering an unsatisfactory result from product purchased for sale, and a serious loss from special product.

QUESTIONS FORMING THE SECOND EXAMINATION.

1. What requisites must be provided in any manufacturing business, for ascertaining costs?
2. State the manufacturing conditions which must exist in a factory, to which the special order method of cost finding would be applicable.
3. State the manufacturing conditions to which the process method of cost finding is applicable.
4. If the process method of cost finding is employed, and the costs of manufacturing 2000 feet of stair carpet is found to be \$600.00, what would be the cost of a customer's order for 30 feet?
5. A factory may produce finished parts, which are placed in a finished parts store room pending the receipt of orders for completed articles. When such orders have been received, the assembling department requisitions

finished parts sufficient for the purpose of putting them together in the number of completed articles required. The costs of the finished parts were ascertained by the process method of cost finding. What method of cost finding is applicable, for determining the cost of a customer's order for a given number of completed articles. Give reasons for your answer.

6. Suppose a factory is to receive an order for 500 articles, each article to be identically the same with respect to material, style, and finish. The required articles are not regular product of the factory, they must therefore be manufactured specially. What method of cost finding is applicable, to the order, and how would the cost of a single article be found?
7. Suppose a factory to receive an order for 500 articles each of which is different as to material, style, and finish, and that the required articles are not regular product of the factory. What method of cost finding is applicable, and how would the actual cost (as distinguished from average cost) of each article be determined?
8. What purpose is accomplished by classifying the departments of a factory?
9. Should the classifications be made before, or after, determining which method of cost finding is applicable, and why?
10. State briefly, but clearly, what is meant by a productive department.
11. State briefly, but clearly, what is meant by:
 - A non-productive department.
 - A miscellaneous department.
12. Suppose a factory maintains a repair shop for repairing the machinery used. How would you classify the department?
13. Suppose the repair shop (question 12) also did repair work chargeable to customers. How would you classify the department?
14. Referring to the distribution, or charging, of expenses—
How would you distribute or charge the following expenses:
 - (a) Salary of the General Manager of the Factory?
 - (b) Wages of a foreman in Department A?
 - (c) Wages of a superintendent for Department B, C, and D?Give reasons in each case.
15. What object is sought by classifying the product of a factory?
16. How would you classify the following lines which constitute the business of a factory:
 - (a) Product of the factory made for, and sold from stock?
 - (b) Product made for customers orders?
 - (c) Merchandise purchased, and sold without incurring any manufacturing expenses.

[illegible]

J. LEE NICHOLSON INSTITUTE OF COST ACCOUNTING

STANDARD BASIC COURSE

THIRD LESSON

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THIRD LESSON

SUBJECTS: DETAILED REPORTS—FACTORY ORDERS—MATERIAL REPORTS.

(Collateral reading, chapters 5 and 6.)

In previous presentations, we have dealt with the elements of cost, methods of cost finding, and classifications for departments, and products, in other words—we have explained the constituents of cost, the methods by which costs are found and the arranging of the departmental divisions of a factory and the separation of its various products so that costs may be applied to them separately.

The next step is to provide the means by which costs may be applied to the product in its progressive stages through the factory.

The first requisite is a means for placing an order for product in operation, that is, putting it into work. This is accomplished by the use of a factory order.

FACTORY ORDERS.

A factory order is a written notification addressed to an appropriate factory authority (Superintendent, Manager, Foreman, or Department) that a certain product is to be manufactured, or a certain piece of work is to be done. The precise form which should characterize a factory order will depend upon particular conditions, the following forms, however, fully illustrate the functions of the orders—

Form No. 1—A simple form of factory order.

Return to Office immediately upon completion.	
FACTORY ORDER	
No. 1000	
Date Jan. 2nd, 1920.	
To E. Forbes, Mgr. Production Department.	
Manufacture the following articles—complete by Jan. 14th, 1920.	
Quantity	Description
50	Hand Trucks, Style H. T. 5
144	Shovels, Style S 2
144	Picks Style P 6
Approved by <u>E. Smith, Sales Dept.</u> <u>J. Wells</u> Manager	

We will now consider, in detail, the purposes served by the above stated factory order.

- (a) The order is to be returned to the Office immediately on completion. This serves the purpose of a notice that production has been completed, which enables the preparation of shipping instructions, and the assembling of the various reports which cover the costs, ascertaining the costs, and invoicing the order to the customer.
- (b) The order is numbered 1000. Each order issued will bear a consecutive number, and all cost reports connected with an order will refer to the order by its number, therefore, the number (in this case, 1000) will be the means by which the various reports of costs will be identified with factory order No. 1000.
- (c) The order is dated.
- (d) E. Forbes, Manager of the production department, is authorized to have the articles manufactured in the quantities stated upon the order, and he is required to see that they are completed by Jan. 14th, 1920.
- (e) The order is approved by E. Smith, of the Sales Department, who thereby assumes responsibility for the correctness of the quantities, the description of the articles, and the date for completion.
- (f) The order is finally signed by J. Wells, the factory manager, as the supreme authority for factory operations.

All work undertaken in the factory must be authorized by a written factory order, which must be explicitly descriptive. Under no circumstances should any work in the factory be undertaken under verbal orders.

The Student will have noticed that the foregoing illustration of a simple form of factory order does not provide for gathering the costs upon the order. It is merely a notification that certain articles are required at a given date. The form would suffice in a factory which embraced few departments.

The following form shows a development of the factory order, shown by our first illustration, to the extent that it also serves the purpose of a requisition upon the store room for the materials required to produce the articles covered by the order. When the factory order is thus developed, a copy should be sent to the stock clerk, in order that he may have the materials in readiness when the original order is presented as a requisition:

Form No. 2—Combined Factory Order, and Material Requisition.

Factory Order	No.	
	Date.	
To. Department.	Complete.	
Manufacture the following.		
.....		

Material Required	Quantity	Rate	Amount

Approved by	(Signed) Manager.
Material received by	

Form No. 2 provides all the details provided by Form No. 1, and in addition, it describes the materials required, the quantity required, the unit cost of each kind of the material, the total cost of each kind of material, and the total material cost of the entire order.

The two illustrations will convey to the mind of the Student the possibility of further developing a factory order to the point of showing also the labor and overhead costs. If developed to this extent the order would serve the purpose of a cost sheet.

The full import of a highly developed factory order, will be better understood by the Student when, at the appropriate stage of the course, he has studied the subject of collecting costs. Our present object is to unfold the procedure of factory routine, with respect to the issuing of production orders, and the procedure to be followed in handling material.

PROCEDURE IN HANDLING MATERIAL AND MATERIAL REPORTS.

In order that a clear conception may follow the consideration of procedure in handling material, we will review it in the order of sequence through which the material passes.

- (1) The necessity for purchasing material must be advised to the proper authority.
- (2) The material must be purchased.
- (3) In due time it arrives, and must be received.
- (4) It must then be stored.
- (5) Quantities, and cost must be recorded.
- (6) It will be requisitioned for use.
- (7) Or, it will form part of the inventory.

(1) Advising the Necessity for Purchasing Material.

This service is accomplished by the issuing of a Purchase Requisition—see form No. 8, collateral reading, page 66. The explicit character of the form renders further explanation unnecessary, except to direct the attention of the Student to the fact that, (as in the case of factory orders, previously referred to) each form bears a number, and consecutive numbers are to be used upon all forms issued. Provision is also made upon the form, for “Purchase order number,” and “Date of Purchase Order.” After this information has been entered upon the form, it is a complete record of the fact that the purchasing department was advised of the necessity for purchasing stated quantities of stated materials, and that the department made the purchase under their purchase order bearing date and number as shown upon the form.

(2) The Material Must be Purchased.

Purchases of Materials are effected through the instrumentality of a Purchase order, which is the natural complement of the Purchase Requisition previously explained. A form of Purchase Order is shown as Form No. 9, collateral reading, page 69.

As in the case of the Factory Order, and the Material Requisition, the Purchase Order bears a number, and each purchase order is consecutively numbered.

(3) The Materials Arrive and are to be Received.

The records for detailing material received are a Receiving Record, Form No. 11—collateral reading, page 73, and a Report of Material Received, Form No. 12, collateral reading page 75. The former record deals with the number of packages received, the description of each package and its alleged contents, or a description of materials received in a more or less bulked condition. With respect to these details it is a confirmation of the Invoice.

The latter form deals with quantities, quality, and description, by actual inspection, in these respects, therefore, it is a confirmation of the purchase order and of the Invoice. The same requirement exists, and is provided for, of numbering each form, and consecutively numbering all forms issued.

(4) The Material Must be Stored.

The most important requisites to be provided for in storing material, are:
Proximity to operating departments.

Adequate space for preserving classifications of materials.

Sufficient light.

Adequate aisle space, in which to move the stock.

The imposition of conditions which will place responsibility for safeguarding the stock.

(5) Quantities and Cost Must be Recorded.

The detailed extent, to which store room records are to be kept, vary of course with particular requirements. If an inventory is to be provided for, and classifications made, the store room records may take the form of Ledger Accounts for each classification both as to quantities on hand, and their cost value.

(6) Material Requisitions.

A material requisition is a written order upon the storekeeper, for delivery of definite quantities of articles or materials to a stated department, for a stated purpose. The requisitions are numbered consecutively, and provision is made for recording the number of the order or process for which the material is to be used. See form No. 16, collateral reading, page 83.

(7) Merchandise Inventory.

In the first lesson, the Student learned that the providing of a perpetual inventory was one of the advantages accruing from a detailed cost system. By closely following the preceding description of the procedure in handling materials from the initial stage of purchasing to the final stage—the inventory—he will perceive how the perpetual inventory is accomplished, so far as purchases and withdrawals of materials are concerned. The procedure for dealing with finished and part finished stock will be the subject of a future lesson.

SPECIAL REPORTS REQUIRED FOR ADJUSTMENT PURPOSES.

In order that the Store room records, and the records which control them, may be kept in proper form, provision must be made for reporting the following contingencies which are liable to occur in any industry.

(a) Reporting merchandise returned by customers.

(b) Department Reports of Materials used.

- (c) Reporting material transferred from one store room to another, or transferred from one operating department to another.

These adjustments may now be considered in the above stated order:

(a) Reporting Merchandise Returned by Customers.

Form No. 18, collateral reading, page 87, covers the necessary requirements for charging the store room records with the cost of the returned merchandise, for adjusting the sales accounts, and for adjusting the account with the customer.

It will be observed that the forms are to be consecutively numbered and that entry is to be made of the number of the order, or process under which the merchandise (now returned) was manufactured.

The form should be carefully studied, and its every purpose clearly comprehended by the Student.

(b) Department Reports of Materials Used.

Form No. 19, collateral reading, page 89, covers the necessary requirements for adjusting the store room records in cases where the materials requisitioned were in bulk, for use as required, or where the materials requisitioned for a particular order, or job, differed in any manner from the materials actually used for the order, or job. In these cases, the Departmental Reports of Materials used enables an adjustment upon the main store room records for an overplus of materials returned by the operating department, or by adjusting the accounts connected with a sub-store room if one is maintained by the operating department.

(c) Reporting Transfers Between Store Rooms, or Operating Departments.

Form No. 20, collateral reading, page 90, covers the necessary requirements for adjusting the department accounts by charging the department which receives the stock, and crediting the department from which the stock was transferred.

Importance of Consecutively Numbering all Reports Used in a Factory.

We cannot too strongly emphasize the importance of providing a different series of numbers for each form of report used in a factory, and consecutively numbering the forms used within each of the series. Each form should also bear the number of any other form to which it relates. Consecutive numbering provides a safeguard against any report not being accounted for, and the relating numbers facilitate investigation in cases where relative details are to be traced.

INVENTORY TEST.

The accuracy of a book (or perpetual) inventory, is capable of being proved only by comparing it with the actual stock on hand. As a rule an actual (physical) inventory is not taken more often than once yearly. If an appreciable difference between the two inventories should at that time be found to exist, considerable detail would be involved in tracing it.

Verifications may be accomplished, from time to time, between the taking of physical inventories, by comparing the book inventory of certain lines of stock with the actual stock on hand. This is what is meant by an "Inventory Test." The tests may be made with sufficient frequency as to cover the greater part, or perhaps all of the stock during a year. A test should in all cases be

made when a line of the stock has reached a point so low as that a comparison may be possible with little effort.

QUESTIONS FORMING THE THIRD EXAMINATION.

1. In view of the fact that the most simple form of a factory order is a mere notification that certain articles are to be manufactured, is it necessary to go to the trouble of issuing such an order?
If so, why?
2. If a factory order describes the articles which are to be manufactured, and also states the kind and quantity of material required for the purpose, what form of material requisition would you use for obtaining the material from the store room?
3. When is a factory order a production order?
4. Would a factory order for construction of machinery, to be used in the factory, be classed as a production order? Give reasons for your answer.
5. How would you classify an order for the production of the following:
Articles requiring special manufacture? Staple product of a factory?
6. If a production order is issued for the manufacture of 500 hats, and each hat is represented by 3 parts separately manufactured, would the order for 500 hats suffice for factory requirements? If so, give reasons. If not, state what additional orders would be necessary.
7. Assume the following conditions:
(a) A store room clerk notices that the stock on hand of a certain material is low. He requests the purchasing department, on an appropriate form to purchase more of the material. What is the name of the appropriate form he uses?
8. What factory forms, and commercial documents, if attached each to the other, would represent the completion of a transaction involving the purchasing of material?
9. If a factory is engaged in manufacturing standard, or staple product, and quantities and kind of material required are invariable, is it necessary to issue material requisitions for each production order issued? Give a concise explanation.
10. If department A requisitions 1000 pounds of wool from the general store room, for production order number 2078 and uses only 600 pounds of the wool in the production of the order, retaining 400 pounds for future use, what is the procedure to be followed, by way of adjustment?
11. Referring to question No. 10, if department A used 1200 pounds of wool for production order No. 2078, obtaining 200 pounds of the wool from department B, what procedure is necessary by way of adjustment?
12. What is the procedure which should characterize the numbering of all factory reports?
13. What procedure is it necessary to follow when material is returned to stock?
14. What charges constitute the cost of material?

15. Prepare a simple form of factory order, in each case, which will serve the purpose of notifying a factory department that the following work is to be put in operation:
- (a) 5 gross cardboard boxes—12"x4"x6"—to be completed in two days.
 - (b) Roll 8 rubber mats, approximately 8'x6'x $\frac{1}{2}$ ".
 - (c) Under factory order No. 1200, Department A turned out product which was defective. Department C is to repair the defect, which was occasioned by using screws that were too short.
16. Prepare a material requisition for the following, required for (b), problem No. 15.
- 120 lbs. Raw Para, grade No. 1; 30 lbs. Raw Para, grade No. 4; 15 lbs. Chalk Alloy.

15. Prepare a single form of record to be used in the purpose of collecting information from the following sources:
- (a) The Bureau of Census
 - (b) The Bureau of Labor Statistics
 - (c) The Bureau of Economic Analysis
 - (d) The Bureau of the Census
 - (e) The Bureau of the Census
 - (f) The Bureau of the Census
 - (g) The Bureau of the Census
 - (h) The Bureau of the Census
 - (i) The Bureau of the Census
 - (j) The Bureau of the Census
 - (k) The Bureau of the Census
 - (l) The Bureau of the Census
 - (m) The Bureau of the Census
 - (n) The Bureau of the Census
 - (o) The Bureau of the Census
 - (p) The Bureau of the Census
 - (q) The Bureau of the Census
 - (r) The Bureau of the Census
 - (s) The Bureau of the Census
 - (t) The Bureau of the Census
 - (u) The Bureau of the Census
 - (v) The Bureau of the Census
 - (w) The Bureau of the Census
 - (x) The Bureau of the Census
 - (y) The Bureau of the Census
 - (z) The Bureau of the Census
16. Prepare a summary statement of the following:
- (a) The Bureau of the Census
 - (b) The Bureau of the Census
 - (c) The Bureau of the Census
 - (d) The Bureau of the Census
 - (e) The Bureau of the Census
 - (f) The Bureau of the Census
 - (g) The Bureau of the Census
 - (h) The Bureau of the Census
 - (i) The Bureau of the Census
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 - (x) The Bureau of the Census
 - (y) The Bureau of the Census
 - (z) The Bureau of the Census

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FOURTH LESSON

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FOURTH LESSON

SUBJECT: WAGE SYSTEMS, FACTORY ORDERS AND MATERIAL REPORTS FURTHER DEVELOPED.

(Collateral reading, Chapters 5, 6 and 7.)

Wage Systems:

All wage systems which aim to compensate an employee according to his merits, are based upon the expectation that the possibility of earning higher wages will stimulate the employee to greater effort, and that the higher wages thus gained will be more than offset to the employer by an increased production, which will reduce the labor cost of the product. The mutual advantage to employer and employee will be better understood by considering the following illustration:

If the wage rate is 60 cents per hour, and the hourly production of an employee is ordinarily 10 units, the labor cost of each unit would be 6 cents. If the employer, by way of stimulating his employees to greater effort, offers 65 cents per hour for the production of 12 units, and 12 units are produced, the employee gains 5 cents per hour. On the other hand, the employer's gain is represented by a reduction in the labor cost of each unit from 6 cents to $5\frac{5}{12}$ cents.

Mutual advantage—within reasonable limits—to employer and employee, will generally be the deciding factor for or against any wage system.

A wage system based upon quantity of product will necessitate a more minute inspection of the product, as the efforts of the employee to increase his production—and his wages—may affect the quality of his work.

Wage systems influence the forms of labor reports which will be required—the Cost Accountant must therefore familiarize himself with the various systems.

Day Rate System:

The day rate system for wages payment is the oldest system in use. It is unfavorable because it does not measurably compensate a workman for the amount of product he turns out. Lack of incentive for best effort is one of its characteristics, and loss of time, which should have been avoided, is one of the results.

The vast importance to an employer of reducing lost time, will be appreciated by an inspection of the following tabulations, which is based upon an average loss of 5 minutes per day by each work man, 9 hours constituting a day's work—300 working days to the year.

Daily Wage:

Number of workmen, and Annual Loss by Each Group.

	1	20	30	50	100
\$3.00	8.34	166.80	250.20	417.00	834.00
4.00	11.12	222.40	333.60	556.00	1,112.00

The elimination of lost time is one of the purposes of the several Wage Systems which have supplanted the day rate system.

Piece Rate System:

The piece rate system bases the workman's compensation upon the amount of work done.

The following comparative details show the elements of cost which the piece rate system is expected to favorably affect.

Day Rate System—8 hr. Day.		Piece Rate System—8 hr. Day.	
Production 10 Units Daily	Labor Cost	Production 13 Units Daily	Labor Cost
Labor Cost (fixed)	\$3.00	Labor Cost (say .32 per unit)	\$4.16
Material Cost (10 units)	4.00	Material Cost (13 units)	5.20
Overhead Expenses:		Overhead Expenses:	
Assumed to be 20 cents per productive labor hour, therefore for day of 8 hours.	1.60	Assumed to be the same as in the case of the production under day rate system:	1.60
Total Cost (10 Units)	<u>\$8.60</u>	Total Cost (13 units)	<u>\$10.96</u>
Cost per Unit	<u>\$.86</u>	Cost per Unit	<u>\$.84-4/13</u>

The comparative illustration shows that although the labor cost under the piece rate system has been increased 2 cents per unit of product, the actual cost to the employer has been reduced by 1-9/13 cents per unit, as follows:

Cost of overhead per unit (for 10 units)	.16	cents
Cost of overhead per unit (for 13 units)	<u>.12</u>	<u>4/13</u>
Reduction in overhead cost, per unit	.03	9/13 cents
Deduct, increased labor cost, per unit	.02	
Net Reduction in Total Cost	<u>.01</u>	<u>9/13 cents</u>

The question of whether the increased production would increase the overhead expenses, is a matter for the most careful consideration in determining a piece rate wage; in fact, it is the dominant question, since any saving to the employer from increased production, consequent upon an increased unit labor cost, cannot be realized in any manner other than by an adequate reduction in the unit cost of overhead expenses.

Differential Rate System:

This is the Piece Rate System modified by an application of time rate to the work. The following illustration will serve as an explanation of the system.

Assume the Following Conditions:

A workman receives 30 cents for each completed unit. His average production is 10 units per day of 8 hours. A differential rate is established, which provides:

If he continues to produce 10 units in 8 hours, the 30 cent rate will continue.

If he produces 12 perfect units in 8 hours, his wages are to be 31 cents for each unit.

If he produces 14 perfect units in 8 hours, his wages are to be 32 cents for each unit.

If by reason of slow, or imperfect work he produces only 9 perfect units in 8 hours, his wages are to drop to 29 cents for each unit.

Also Assume:

Cost of material to be 10 cents per unit.

Overhead expenses to be \$1.50 per day when 10 units are produced.

\$1.55 per day when 12 units are produced.

\$1.60 per day when 14 units are produced.

The following table shows the effect of the foregoing conditions upon production costs to the employer, and upon the wages of the workman.

No. of units	Wages per unit	Labor Cost	Cost of Material	Cost of Overhead	Total Cost	Cost per unit
9	.29	\$2.61	.90	\$1.50	\$5.01	.55 $\frac{2}{3}$
10	.30	3.00	1.00	1.50	5.50	.55
12	.31	3.72	1.20	1.55	6.47	.53 $\frac{11}{12}$
14	.32	4.48	1.40	1.60	7.48	.53 $\frac{3}{7}$

The crucial question arising, from an inspection of the table, is:—Are the gains to the workman and to the employer, for the production of 12 and 14 units, equitably apportioned? If any marked inequality exists, the system will ultimately fail. The table shows a decided gain in wages to the workmen, and only a fractional gain to the employer. Consideration must, however, be given to the fact that his fractional gain is in respect of a single unit produced. If the fractional gain were multiplied by thousands of units produced, and the selling price remained the same, his total gain would probably be a very substantial one.

Premium Plan:

The premium plan of wage payment bases minimum wages on a time rate, and provides for extra rates for time saved in the work.

For the purpose of illustration, suppose a workman receives 30 cents per hour for a certain average amount of work done in a day of 8 hours. A premium arrangement might be made, under which if he did the same amount of work in 7 hours he should receive (7x30) \$2.10, and for the hour saved he should receive 15 cents, his compensation for 7 hours of work being \$2.25. He then has another hour to work, for which he may earn 30 cents, and a further premium.

Increased production (and the resulting decrease in the unit cost for overhead expenses) is the object sought by the Premium Plan of wage payment, the same as with Piece Rate and Differential Rate Plans.

Bonus Plan:

The basis of the Bonus Plan is a daily wage for a specified amount of product, and a Bonus for each unit produced in excess of the specified amount. The Plan is closely allied to the Premium Plan.

Task Work. With a Bonus—Gantz System:

The special features of this system are the setting of a standard—or task—which is to be undertaken by the workman at day rate wages. If the time allowed for the task is (say) 3 hours, the workman who accomplished it in 3 hours or less, is given (say) 4 hours pay. If the workman does not accomplish the task within the time allowed for it (the standard time) he receives only his day rate of wage. The standard time plus the bonus time is equivalent to a piece rate wage plan for the workmen who earn the bonus time. Workmen who do not earn bonus time are paid upon the day rate plan.

A further development of the plan provides for a bonus to foremen as an incentive to the developing of inferior workmen working under their supervision. By way of illustrating this feature, a foreman supervising 20 men might be offered 8 cents each, or \$1.44, if 18 of the men earned bonus time, or 10 cents each—\$2.00—if all the men earned bonus time. Under such arrangement, foremen would use every possible effort to instruct the inferior workmen and develop them to the requisite point of efficiency.

FACTORY ORDERS, MATERIAL REPORTS.

Further development of the subjects.

Factory orders and Material Reports formed the subject of the preceding lesson.

These subjects are so vitally important, in any cost accounting system, that we deem it necessary to revert to them.

The explanations and exemplifications given in the preceding lesson were intended to demonstrate the purpose for which a factory order is issued. We now take up the subject in a more general way, in order to show the full scope or utility, of a factory order.

- (a) The simple form of factory order, which is a mere notification that certain product is to be manufactured, is adequate only when very simple manufacturing conditions exist, therefore, the factory—or production order—is to be considered in the broader way in which it is usually used.
- (b) The form of a factory order entirely depends upon the service which it is to render. By “form of order” we mean the design, and the provisions necessary for presenting instructions, for attaching responsibility, and for showing what disposition has been made of the information shown upon the order.
- (c) The orders are to be distinctive, in conformity with the purposes for which they are issued. A factory engaged in manufacturing product for special orders, and in manufacturing a standard product would require distinctive factory (or production) orders for each class of product. These, again, are subject to the various subdivisions under which standard product is carried upon the factory records—such as—finished product, part finished product, Finished parts, etc.
- (d) Distinctive orders are required in the following cases:—
 - (1) When defects in product are to be corrected.
 - (2) When sub-production orders are issued.
 - (3) When the construction of machinery, for factory use is to be undertaken in the factory.
 - (4) When any part of the Plant, or factory equipment is to be improved by work done in the factory.
 - (5) When any repair work to Plant or equipment is to be done in the factory.

The foregoing development of the factory, or production order, justifies the statement that it is a very important adjunct in a cost accounting system.

MATERIAL REPORTS.

The subject of Material Reports, as in the case of factory orders, is of such importance that we deem it advisable to again take it up.

The correctness of merchandise inventories depends very largely upon the correctness of material reports with respect to quantities and description of materials received and issued.

Inaccuracies, in either respect, will be responsible for expenditures of time in tracing differences which ought not to have existed. The course through which material reports are passed should be thoroughly understood by the student. See page 95 of collateral reading.

QUESTIONS FORMING THE FOURTH EXAMINATION.

1. Briefly define the purposes for which a factory order is issued for factory production.
2. When a factory is largely engaged in making a standard product, kept in stock, what special consideration should be given to the issuance of factory orders for such product, with respect to quantities to be produced, and for what purpose?
3. Admitting the necessity for reducing clerical work as much as possible, how would you save clerical effort, in issuing factory orders, in case a factory was engaged in producing, say, 30 articles, for 30 different customers, the 30 articles being represented by 3 different kinds only?
4. If an order is received for 100 articles complete, and each article is represented by 5 separately manufactured parts how would you order the factory to proceed with the requisite production?
5. If a factory constructs machinery for its own use, what form of factory order would be required to authorize the construction?
6. Suppose a factory order to have been issued for the laying of a cement floor in the store room, by factory employees, no other prepared flooring having previously existed. How would the cost of the cement floor be accounted for in the general accounts, if the store room were owned by the owner of the Factory?
7. By what means are factory orders, and the various forms of material reports, traced, and accounted for? Explain the procedure.
8. Before approving purchase Invoices for payment what procedure should be followed?
9. Explain briefly, but sufficiently, the purpose served by a Bill of Materials.
10. In view of the fact that materials are not issued from the store room except as requisitioned, that is, upon written orders, why is it necessary to also have a Report of Material used?
11. What are the principal disadvantages of the day rate system of paying wages?
12. Name some of the indirect (overhead) expenses which would naturally tend to increase with an increased production realized from a piece rate system of wage payment.
13. If materials or supplies are issued from the general Store Room to an operating department, for use as needed, how are the materials or supplies to be accounted for?
14. What class of labor is the day rate system of wage payment applicable to, and why?

1. The first step in the process of the investigation is to identify the problem and to determine the scope of the investigation. This involves a thorough review of the available information and a determination of the objectives of the investigation.

2. The second step is to develop a plan of investigation. This involves determining the methods to be used, the personnel to be assigned, and the schedule for the investigation.
3. The third step is to collect the data. This involves gathering all the information that is relevant to the problem.
4. The fourth step is to analyze the data. This involves examining the data to determine what it means and how it relates to the problem.
5. The fifth step is to draw conclusions. This involves making a decision about what the results of the investigation mean and what should be done next.
6. The sixth step is to report the results. This involves writing a report that describes the findings of the investigation and the conclusions that were drawn.
7. The seventh step is to implement the recommendations. This involves putting the recommendations into action.
8. The eighth step is to evaluate the results. This involves determining whether the investigation was successful and whether the recommendations were effective.
9. The ninth step is to communicate the results. This involves sharing the findings of the investigation with the appropriate parties.
10. The tenth step is to review the process. This involves looking back at the investigation to see what was done well and what could be improved.
11. The eleventh step is to document the results. This involves keeping a record of the findings of the investigation and the conclusions that were drawn.
12. The twelfth step is to disseminate the results. This involves making the findings of the investigation available to the appropriate parties.
13. The thirteenth step is to follow up on the results. This involves checking back to see if the recommendations were effective and if the problem was solved.
14. The fourteenth step is to provide feedback. This involves giving the appropriate parties a chance to provide feedback on the investigation process.

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STANDARD BASIC COURSE

FIFTH LESSON

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FIFTH LESSON

SUBJECT: LABOR REPORTS.

(Collateral Reading, Chapter 8.)

The purpose served by Labor Reports is that of providing information from which labor costs may be ascertained. This apparently simple requirement is found to be much more complex when consideration is given to labor classification, and the various conditions which will determine the form of report to be used.

The classifications commonly required for labor reports are:

- (a) Direct, or productive labor, that is, labor directly chargeable to the product.
- (b) Indirect, or non-productive labor, that is, labor expended upon work of the factory, but in such a way that it cannot be distinctly allocated to any definite part of the product, such for instance as the work of superintendents, foreman, factory clerks, etc., whose work is wholly connected with the entire product of the factory, but not distinctly applicable to any definite part of it. For instance, a foreman usually supervises a shop or an entire department. If his time is not fully occupied upon the production of a single order, job, or article produced in the shop or department, his time must be charged against all the orders, jobs, or articles, produced in the shop or department, the charge to be borne by a particular order, job, or article, being a pro-rata share of the total charges.
- (c) Labor operations, that is, direct labor expended in two or more distinctly separate operations before a product is completed.

After classification has been determined, consideration must be given to the following questions:

- (1) Are the labor reports to be used for pay roll purposes?
- (2) Are they to be used for cost purposes?
- (3) Are they to answer both of these purposes?
- (4) Are they to be made daily, or at a time which conforms to the cost period?
- (5) Are they to report day work?
- (6) Are they to report piece-work?

The foregoing does not enumerate all of the considerations which may affect the form of a labor report; the considerations mentioned, however, will apply in the majority of instances. Others will arise from special conditions which attach to every factory.

A well planned form of labor report will provide the possibility of determining the labor cost of an order, job, article, or process, or of any distinctive part, and this result should be accomplished with a minimum amount of clerical detail. Some part of the clerical detail must be performed by the workmen, any duties imposed upon them in connection with the reports, however, must not involve writing or computing, which it is possible to accomplish by other means, and the demand made upon their time must not be excessive.

From what has been said respecting classification and conditions which will largely determine the form which labor reports must take, the student will have grasped the importance of preserving to the fullest possible extent, the relation which the individual report must at all times bear to the classification or other distinctive feature, of which it is a part.

Occasions will arise which require great care in ensuring the application of labor costs to the proper classification. For instance, a workman may work partly at day rate, and partly at piece rate production during the period covered by his labor report. If separate reports are not made, his report must designate the two classifications with sufficient distinctness to ensure the charges being made to the proper classification.

The necessity for accuracy of labor reports cannot be too strongly urged. Inaccuracy in the reports will falsify the labor costs. As an instance, suppose a workman to have worked 5 hours on order number 987, and 3 hours on order 789. If he misapplies his time to the respective orders, by charging 5 hours to order number 789 and 3 hours to order number 987, incorrect labor costs will be shown for both orders. The labor report, however, will show that the workman accounted for his full days work of 8 hours. The possibility of inaccuracies of this nature are reduced by requiring the labor report to show a description of the work done.

The methods to be employed in obtaining labor costs, will be largely decided by a consideration of the following requirements.

- (a) The greatest possible degree of accuracy.
- (b) The reporting workman must not be required to devote an excessive amount of time to the making out of his report.
- (c) The reports must be free from uncertainties.

If workmen are individually engaged upon several jobs during a day, loss of time and inaccuracies would certainly result if they were required to report their time. Under such conditions, it is the practice of foremen to assign to each workman several jobs ahead, the assignments being kept upon a spindle by the workman. When work is commenced, the assignment is stamped by the workman (a time stamp being used for the purpose) and placed upon a second spindle pending its completion. When completed, the assignment is again stamped, by the workman, with the ending time, and transferred to a spindle used for completed assignments. The completed assignments are collected from the spindle by a factory clerk, who uses them as the basis for making up the labor reports. This procedure minimizes the possibility of loss of time and inaccuracies.

The workman does not lose time waiting for instructions, the foreman providing ahead of the workman's requirements. Reporting time, by the workman, is confined to the instantaneous process of stamping the work order, which also eliminates inaccuracies, and noting the time off for mid-day meal, or for any other purpose.

As in the case of material reports, Labor Reports are to be numbered, collected, examined, priced, calculated, the accounts to be charged and credited are to be indicated, they are to be posted to the relating records, and they are to be properly filed.

Labor Reports, when used for pay-roll purposes, must show the date, workman's number, his name, the department with which he is connected, the operation, upon which he was engaged, his time, and the rate and amount of his wages.

For the purpose of ascertaining Costs, Labor Reports must show the order number, description of work, quantity accomplished, time consumed, rate and amount of wages, the department operation, occupation of the workman, and the necessary record of any machine which may have been specially operated in connection with his work.

QUESTIONS AND PROBLEMS FORMING THE FIFTH EXAMINATION.

The subject of Labor Reports is so important, in any Cost System, that we confine this examination to the subject.

Each question given may be properly answered if Chapter 8 of the collateral reading has been thoroughly understood by the student.

1. (Problem) Prepare a form of Labor Report, in each case, which will properly record the following details under date of January 2, 1920.
 - (a) John Smith, Moulder, employee No. 20, in Foundry Department worked 3 hours on job No. 1720, for a brass casting. His wage rate is \$4.80 per day of 8 hours. Harry Brandt is foreman of the department.
 - (b) James Bell, Machinery Oiler, employee No. 126, in Department C, worked 3 hours in Department C, and 5 hours in Department A. His work in Department A was temporary only, the regular oiler being absent. His wage rate is \$3.00 per day of 8 hours. W. Good is foreman of Department C, and S. Glass is foreman of Department A.
 - (c) Hugo Jones, Hose Tester, employee No. 58, in Department B worked full day of 8 hours, and tested 3000 feet of No. 9 Garden Hose, 50 lengths. His wage rate is $4\frac{1}{2}c$ per length. He used Compressor No. 3. Inspector for the Department is Charles Slater.
2. In the case of (b) above, prepare what you consider a proper notification of the transfer of James Bell from Department C, to Department A.
3. Briefly give your reasons for the notification you consider is necessary under (b).
4. What records are necessary in the payroll department for the purpose of pricing labor reports?

For the purpose of such studies, the number of workers employed in the industry of which the department concerned is a part, and the number of workers in the department concerned, are the two main factors which the department must take into consideration in connection with its work.

QUESTIONS AND ANSWERS ON THE SUBJECT OF THE DEPARTMENT OF THE INTERIOR

The subject of the Department of the Interior is a very important one, and it is one which has been the subject of much discussion in the past.

There are many questions which have been asked in the past, and it is the purpose of this department to answer them in a satisfactory manner.

1. (a) The first question is: What is the purpose of the Department of the Interior? The answer is: The purpose of the Department of the Interior is to manage the public lands and to protect the interests of the people in the use of these lands. (b) The second question is: What are the main functions of the Department of the Interior? The answer is: The main functions of the Department of the Interior are to manage the public lands, to protect the interests of the people in the use of these lands, and to carry out the policies of the Government in relation to the public lands.

2. (a) The first question is: What is the history of the Department of the Interior? The answer is: The Department of the Interior was created in 1849, and it has since that time been responsible for the management of the public lands. (b) The second question is: What are the main achievements of the Department of the Interior? The answer is: The main achievements of the Department of the Interior are the establishment of the National Park System, the creation of the Bureau of Land Management, and the development of the public lands for the benefit of the people.

3. (a) The first question is: What are the current issues facing the Department of the Interior? The answer is: The current issues facing the Department of the Interior are the management of the public lands, the protection of the interests of the people in the use of these lands, and the development of the public lands for the benefit of the people. (b) The second question is: What are the proposed solutions to these issues? The answer is: The proposed solutions to these issues are the establishment of a new Department of the Interior, the creation of a new Bureau of Land Management, and the development of the public lands for the benefit of the people.

4. (a) The first question is: What is the future of the Department of the Interior? The answer is: The future of the Department of the Interior is uncertain, but it is likely that it will continue to be responsible for the management of the public lands. (b) The second question is: What are the challenges facing the Department of the Interior in the future? The answer is: The challenges facing the Department of the Interior in the future are the management of the public lands, the protection of the interests of the people in the use of these lands, and the development of the public lands for the benefit of the people.

5. (a) The first question is: What is the role of the Department of the Interior in the future? The answer is: The role of the Department of the Interior in the future is to manage the public lands and to protect the interests of the people in the use of these lands. (b) The second question is: What are the responsibilities of the Department of the Interior in the future? The answer is: The responsibilities of the Department of the Interior in the future are to manage the public lands, to protect the interests of the people in the use of these lands, and to carry out the policies of the Government in relation to the public lands.

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SIXTH LESSON

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SIXTH LESSON

SUBJECTS: APPLICATION OF OVERHEAD (INDIRECT EXPENSES) TO DEPARTMENTS.

Charges for depreciation and maintenance.

(Collateral reading chapters 9 and 10.)

Preceding lessons have dealt with the elements of cost, methods of cost-finding, the philosophy of department and product classification, the various forms of orders required for authorizing product, and forms of reports for reporting material used, and labor expended upon the product. These are direct costs.

Following the natural order of progression, we may now present the subject of Indirect, or Overhead costs.

APPLICATION OF INDIRECT (OVERHEAD) COSTS TO DEPARTMENTS:

All costs which cannot be distinctly identified as having been incurred for the sole benefit of a given order, job, or article, will be chargeable against any aggregation of orders, jobs, or articles which may have been solely benefited by the costs. Such an aggregation may be represented by an operation, process, department, or if the indirect costs relate to the factory as a whole, the aggregation would be represented by the entire factory product.

When costs cannot be applied directly to the product, they must be applied to the product upon a basis—more or less arbitrary—as nearly approaching their actual incidence as may be possible.

Our present object is to indicate the methods which must be employed for reducing the amount of indirect expenses, which are to be arbitrarily charged against product, by applying as much of such expenses as may be possible to the product which solely benefits by them. It may be taken as an axiom, that the value of a Cost System is measurable by the small proportion of manufacturing expenses which the System recognizes as, "General Factory Overhead" for arbitrary distribution over the entire factory product. True Costs are the actual costs, therefore, in the interest of true costs, no reasonable effort should be spared in determining the extent to which an indirect cost may be applied as solely benefiting any departmental division of a factory. By reasonable effort, we mean an effort commensurate with the result to be obtained, that is, the importance of the result must warrant the clerical details required for its attainment.

The application of Overhead to departments exclusively benefiting by the overhead expense, will be understood from the following illustration.

If there are five operating departments in a factory and a superintendent is employed to devote his entire time to the supervision of four of the departments, it would clearly be improper to charge any part of his salary to the department with which he was not connected. The four departments supervised by him must bear the entire expense. It may not be practicable to charge his

time to the four departments from a time report, that is, a report of his daily time devoted to each department, or to satisfactorily apportion his salary upon a basis of the demands made upon his time by each one of the four departments, but, there is absolute certainty that the four departments absorb his entire time, therefore, an arbitrary application of his time is confined to the product of the four departments, this limitation bringing the cost of supervision nearer to true costs than would be the case if dealt with in any other manner.

There are indirect, or overhead, expenses in all manufacturing businesses which a superficial consideration would class as General Overhead, or overhead requiring distribution over the entire product of the factory. Upon careful consideration however, it will be seen that such expenses may be resolved into departmental overhead with a degree of accuracy that is much nearer true Cost than would be the case if the expenses were distributed as General Overhead.

The following are instances of the expenses referred to:

Rent:

May be directly allocated to department classification on the basis of floor space occupied by each. Suppose for instance that an annual rent of \$8,000.00 is paid under a lease taken by an iron working plant, the lease covering property having an area of 600,000 square feet. We will assume the machine shop of the plant requires and uses an area of 100,000 square feet. Obviously, as the Machine Shop occupies and uses $\frac{1}{6}$ of the entire leased space, it is chargeable (other considerations being equal) with $\frac{1}{6}$ of the annual rent, or \$1,333.33. Again it is possible to equitably distribute the machine shops annual rental of \$1,333.33 to each distinctive operation carried on in the shop, and upon the same basis. For instance, a boring machine, or a lathe occupying and requiring 200 square feet (other considerations being equal) would be chargeable with an amount of the annual rent equal to \$2.66. In this connection, the Boring Machine, or Lathe, would be classified as an operation. It will now be clear that the entire annual rent of \$8,000.00 may be equitably distributed to the various department classifications of the plant, to the end that no part of it is departmentally unaccounted for. Such a distribution of the annual rent would be much nearer true costs for rent than could be obtained by any plan of general distribution.

Insurance, Fire and Liability:

Insurance may be directly charged to departments on the basis of property values covered—in the case of fire insurance—and average amount of pay-roll in the case of Liability insurance.

Depreciation:

May be directly charged to departments on the basis of the provision made for the property in each.

Real Estate Taxes:

May be dealt with upon the same basis as rent.

Property Taxes:

May be directly charged to departments upon the basis of the taxable property values in each.

The foregoing expenses of a generally indirect character are particularized for the purpose of illustrating the principle that in the interest of true costs, the

incidence of indirect charges should fall upon the product in proportion to the benefit it receives therefrom . Other expenses such as Power, Heat, Light, etc. are subject to departmental distribution as direct expenses.

Fluctuations in Overhead Charges:

One of the important services to be rendered by a cost system is the presentation of costs sufficiently analyzed for the purpose of enabling comparisons to be made of each element of cost, as between one cost period and another. If fluctuations in overhead charges are permitted, which do not in reality exist, the value of comparisons is destroyed.

If, for instance, periodic expenditures are made in advance, or in arrears, and the expenditures are for the benefit of a period not wholly represented by the cost period in which they fall, the expenditures should be apportioned to the periods for which they were made. Thus, if a cost period is represented by a calendar month and rent—\$1,500.00— is paid quarterly in advance, or in arrear, \$500.00 would be the proper proportion to charge to the costs of each cost period for the quarter. If the rent were paid in advance, the \$1,500.00 paid for 3 months in advance should be charged to "Prepaid Rent," \$500.00 being credited to "Prepaid Rent" and charged to "Rent" at the end of each cost period. If the rent were payable 3 months in arrears, "Rent" should be charged with \$500.00 each month and credited to "Reserve for Accrued Rent," or to the Lessor as a creditor. In this manner the costs of each month, or cost period, would bear their actual proportion of the rental charge. The student will perceive the inaccuracy which would result from charging the entire rent—\$1500.00—to the cost period in which it was paid. Two cost periods would escape any charge, and one cost period would bear the entire charge.

Departmental Supplies:

Supplies, such as Oils, Grease, Waste, Small Tools, etc., are usually requisitioned in more or less bulk, that is, the precise quantity required for any particular job being unascertainable, a quantity is called for to be used as needed. As in the case of rent, referred to above—if the supplies were charged to the cost period in which they were requisitioned, and a part remained unused, that particular cost period would bear an expense which was properly applicable to a subsequent period.

Fluctuations of this nature are prevented by charging the supplies to a department sub-store room, which should receive credit at the end of each cost period, for the quantities issued on department requisitions during the cost period, charge being made to the current costs of the department. The balances shown by the account with the department sub-store-room would represent the inventory of supplies on hand unused. If the book inventory and physical inventory were not in reasonable agreement with each other, an investigation would probably show that the estimates of the supplies used required revising.

Fluctuations may be caused by variations in the volume of product turned out during different cost periods. Such causes are the outcome of business conditions which may not be preventable, but, a properly conducted cost system will unerringly indicate the cause and its effect. This is another very important function of cost accounting.

Distribution of Overhead:

From what we have said upon the subject of applying Overhead charges, it naturally follows that the distribution of overhead should take the following course:

- (a) Overhead directly assigned to a productive department should be distributed over the product of that department.
- (b) Overhead directly assigned to non-productive, or Indirect departments, should, together with the direct cost of such departments, be distributed over the product of the productive departments.
- (c) Factory Overhead of a general character, applicable to the factory as a whole, should be distributed over the productive departments.

The methods used for accomplishing the distribution will form the subject of a future lesson.

Charges for Depreciation and Maintenance:

The determining of a proper depreciation rate, to be applied to any wasting asset, depends upon the period during which the Asset may continue to usefully perform its function. The period of continued usefulness depends entirely upon the conditions under which it is used, and the probabilities with respect to its retirement from service by reason of improved devices for doing the work to greater advantage. Our representation respecting fluctuations in Overhead expenses are applicable with equal force to depreciation and maintenance.

By way of illustration, suppose new machinery to be installed in a factory, and operated say two years before any maintenance expense were incurred, and that at the end of the two years a repair costing \$500.00 was necessary. If no provision for repairs were made during the two years, the product of the factory during the two years escaped any cost for repairs, although each day's work done by the machinery contributed to the wear and tear which ultimately involved a repair costing \$500.00. This presents another case which required an estimated charge, as the probable expense of maintenance, for each cost period, from the installation of the new machinery to the time at which repairs would probably be required, such estimated charge being offset by credit to a "Reserve for Maintenance," the actual cost of the repair (\$500.00) being charged to the above stated reserve. Any appreciable difference between the reserve and the actual cost would be the subject of investigation and adjustment.

QUESTIONS FORMING THE SIXTH EXAMINATION.

1. Give a sub-division of the three elements of cost, and give an illustration of each.
2. Give classifications for each one of the following expenditures which have entered into the construction of a Tool Box, and state how the import charges under (d) would be dealt with upon the records:

(a) Lumber	}	The application of cost to each unit manufactured is satisfactorily determinable.
(b) Hinges and Handles		
(c) Lock (Imported)		
(d) Import charges on Lock		
(e) Varnish	}	The application of cost to each unit manufactured is not satisfactorily determinable.
(f) Screws and Nails		
3. Referring to question No. 2, how would the labor for operations (e) and (f) be classified?
4. If A, B, C, D, represent the manufacturing departments of a factory, state how the following expenses should be charged?
 - (a) Wages of clerk employed in A and B.

- (b) Wages of foremen (one in each department).
 - (c) Wages of superintendent (supervises all departments).
 - (d) Packing expenses—incurred solely for the product of A and B, the product being regularly packed and stored as finished product.
 - (e) Packing Expense—incurred solely for the product of C and D, the product being packed when ordered for shipment.
5. Are factory costs affected by:
 - (a) Trade discounts deducted from purchase invoices?
 - (b) Allowances deducted from sales invoices?
 - (c) Rebates received upon purchases?
 - (d) Cash discounts allowed for payment of purchase invoices?
 Give reasons for your answer in each case.
 6. If an order is received for 100 articles, each article requiring special production, what method of cost-finding would be applicable, and why?
 7. State the method of cost-finding applicable if 50 similar articles, and 50 dissimilar articles are ordered. None, however, are standard product of the factory.
 8. If 50 similar articles are ordered (not standard product) and 50 articles are ordered (standard product), what method of cost-finding is applicable and why?
 9. Classify—as to productive, non-productive, or miscellaneous—the following departments of a metal working plant:
 - (a) Foundry Department.
 - (b) Purchasing Department.
 - (c) Pattern-making Department, if all patterns are made for special orders which will not be repeated.
 - (d) If patterns are for special orders from customers, who may repeat them?
 - (e) If patterns for special orders are made, and patterns for standard factory product are made.
 10. What advantage is to be derived from classifying the product of a factory?
 11. Is the material requisition always a satisfactory record from which to charge material costs for:
 - (a) A definite order, or article?
 - (b) A process.
 - (c) If not—give reasons and explain how the material costs would be ascertained.
 12. What information must a factory order show, if it is to be used for the following purposes:
 - (1) Factory order and material requisition?
 - (2) Factory order and instructions to foreman?
 - (3) Factory order and Labor Report?
 - (4) Factory order and Production Report?
 - (5) Factory Order and Shipping Record?
 - (6) Factory Order and Cost Sheet?
 13. If materials are issued from the General Store-room to Department A in bulk, for use as needed, how would the transaction be recorded?

- (a) Upon the General Store-room records?
 - (b) Upon the Records of Department A?
 - (c) If Department A transfers part of the Materials to Department B, what records would be required?
- 14. To what class of labor is a day-rate of wage payment applicable?
 - 15. Describe the connection which exists between Labor Reports, Pay Rolls, and the labor costs of Cost records.
 - 16. What must a Labor Report show in order that it may be used for:
 - (1) Pay Roll purposes?
 - (2) Cost purposes?
 - 17. What do you understand to be the meaning of "Indirect" charges or "Overhead?"
 - 18. What principle must be followed in apportioning Indirect charges as they occur?

ANSWERS TO QUESTIONS FORMING THE NINTH EXAMINATION.

1. The disadvantages experienced by the management are, that no proof of accuracy exists, and the guidance of proper classifications is lacking. (Collateral reading, Chapter 16.)
2. The term "Cost period" means an equal fractional part into which the calendar year is divided for the purpose of ascertaining costs at stated times during the year. The best duration for a cost period is the period covered by the Pay-roll. (Collateral reading, Chapter 16.)
3. The principal feature of difference between a Purchase Record and a Voucher Register are:
 - (1) The purchase Record requires the use of a ledger for the accounts of creditors, to which each purchase is posted. The Voucher Register provides for details which show the payment of each purchase. Unpaid purchases are therefore indicated by the open items, which virtually represent a creditors ledger, as to amounts outstanding, unpaid. (Collateral reading Chapter 16.)
4. A Distribution Record would be necessary when the impersonal accounts are too numerous to be conveniently provided for on the Purchase Record or Voucher Register. (Collateral reading chapter 16.)
5. The total of each column of the Distribution Record would be posted to the account indicated by the caption of the column. Collateral reading, chapter 16.)
6. An analysis of the Pay Roll would be required when the pay-roll is used, for wage payment only. In this event, the pay-roll would deal only with the wages due to each workman and the total wages paid. (Collateral reading, chapter 16.)
7. The purpose of a Pay Roll analysis is to ascertain the amount of wages paid for each factory department, and the respective amounts paid for direct and indirect labor. The details are required in order that the appropriate accounts may be charged. (Collateral reading, chapter 16.)
8. The cost sheets of uncompleted work taken collectively show the inventory of Work in Process. (Collateral reading, chapter 16.)
9. The agreement is effected only at a particular time which is at the end of a cost period, when the details have been collected upon summarizing records. (Collateral reading, Chapter 16.)
10. The cash advance of \$350.00 would be entered in the miscellaneous column of the Purchase Register, as a charge against the company. (Collateral reading, Chapter 16.)
11. The \$350.00 would be entered in the "Miscellaneous column" of the Voucher Register, as a charge against the company. (Collateral reading, Chapter 16.)
12. (1) The \$120.00 would be entered in the miscellaneous column of the Purchase Record, as a charge against selling expenses. In the voucher register it would be entered in the column headed "Selling expenses."
 - (2) The \$50.00 would be entered in the column headed "Administrative Expenses" in the Purchase Record, and in the Voucher Register.

- (3) The \$30.00 would be entered in the "Miscellaneous column" of the Purchase Record, as a charge against supplies. In the voucher register it would be entered in the column headed "supplies."
 - (4) The \$875.00 would be entered in the column headed "Raw Materials" in the Purchase Record, and in the Voucher Record. (Collateral reading, Chapter 16.)
13. A further distribution would be made in a Distribution Record, which would provide a separate column for each required classification. (Collateral reading, Chapter 16.)

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SEVENTH LESSON

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SEVENTH LESSON

SUBJECTS: DISTRIBUTION OF FACTORY OVERHEAD—FACTORY OVERHEAD REPORTS.

(Collateral reading, chapters 11 and 12.)

The preceding lesson dealt with the subject of departmental application of overhead.

The distribution of Overhead to the product is the next subject to be considered.

The fact that overhead charges require distribution, implies the impossibility of charging them to the product in an exact manner. A method, more or less arbitrary, must be employed, which will give the nearest approximation to exactness. In deciding upon the method to be used, considerations of simplicity, or saving of clerical effort should not be deciding factors.

Whatever method is used, it must conform to the particular conditions of the business to which it is applied.

The methods commonly employed for distributing overhead, are as follows:

Prime Cost Method of Distribution:

The prime cost method of distributing overhead is based upon a contingent relationship existing between the overhead expense, and the total cost of direct material and direct labor. The philosophy of the method requires that direct material and direct labor costs are invariable as to amounts, and as to their proportions one to the other. The requisite conditions are so rare in any factory that the method may be said to be of negligible importance.

Productive Labor Cost Method of Distribution:

The productive labor cost method of distribution is applicable only in cases where labor is the dominant cost, and where the product, time expended upon the product, and the wages paid are uniform. These conditions may exist in a department, but rarely throughout all the departments of a factory.

Both of the methods considered above are percentage methods. They are respectively operated by ascertaining the direct material and labor costs (prime cost method) or the productive labor costs, and to these costs is added a percentage, based upon previous experience, which is estimated to absorb the overhead expense for any cost period.

Productive Labor Hours Method of Distribution:

The productive labor hours method of distributing overhead has a greater range of utility than the percentage methods above referred to. The plan is based upon time only, and, to a very great extent the overhead expenses of a factory accrue on the same basis—time. Rent, Insurance, Depreciation, Repairs, Light, Heat and Power, for instance, constitute the most important part of factory overhead, and all of these expenses are measured by time.

Machine Rate Methods of Distribution:

There are a variety of these methods for distributing overhead. In a general way, the object of each is to charge to each machine, or process, any definitely assignable expense, together with a proportion of the departmental overhead (including the department's proportion of general factory overhead) to which is added the direct labor cost of operating the machine.

The total cost of operating the machine, thus obtained, furnishes a basis for computing the hourly cost, which is applied to all product operated upon by the machine for the number of hours consumed by the operation.

Machine rate methods are applicable only to machine operations. They will give a nearer approximation to true costs by reason of the absorbing of costs as direct costs—which otherwise would be classed as overhead.

Use of Formulas:

The Student should use formulas for mathematically expressing the relation of each quantity or amount which enters into a computation for the distribution of overhead. Entries upon factory records should show the formulas under which distributions have been made. By this means, explanation is immediately apparent, whereas a written explanation would involve considerable trouble and would not be nearly as effective. The advantages of a formula is shown by the following:

Machine No. 10 (Department B).

$$\begin{array}{rcl} \text{Operating Labor Cost} & \$200.00 & \\ \text{Applicable Overhead} & \underline{50.00} & \$250.00 \\ & & \hline & & = .16\text{-}2/3 \text{ hourly machine rate} \end{array}$$

Operating machine hrs. 1500

Factory Overhead Reports:

From what has been said respecting overhead, its application and distribution, it will be evident that a system must exist for collecting and reporting the overhead expenses. It will also be evident that overhead expenses must be clearly indicated as such upon all the records of a factory in order that they may be properly reported.

The methods employed for collecting all factory costs, direct and indirect, will be the subject of a future lesson. The records used for the purpose—known as summarizing records—will collect the overhead costs, and the direct material and direct labor costs at the same time for each cost period. The student will here perceive that the accuracy of the summarizing records will depend upon the care with which the costs are expressed upon the various factory records and reports from which the costs are summarized.

The records and reports from which overhead charges are usually obtained, are as follows:

Purchase Record: For indirect material and supplies which have been purchased for a particular department and delivered to the department without passing through the general store room. If such purchases are in bulk, that is, if they are in excess of requirements for a current cost period, the amounts actually used during the cost period—as shown by requisitions issued within the department—would be the amounts to be charged in respect of the period.

Material Requisitions and Reports of Materials Used: For indirect materials and supplies, requisitioned from the general store room, or from depart-

ment sub-store rooms, the materials would usually be such as are used in small and variable quantities which cannot be satisfactorily charged to the product directly, such as, wire nails, screws, small tools, scrap material, etc. The supplies would include machine oil, grease, waste, etc.

Labor Reports or Pay Roll: For indirect labor, such as, work of superintendents, foreman, factory clerks, truckers, etc., etc., who do not work directly upon the product. If the payroll is completely classified as to productive and non-productive (or indirect) labor, and also as to departments, it will present the necessary details for ascertaining the overhead represented by indirect labor. If the pay-roll is not so classified, the details must be obtained from the labor reports.

Reports Showing Fixed Charges and Other General Factory Overhead: These reports, or schedules show the amount chargeable to each cost period for its proportion of expenses, which are of a more or less fixed character, such as Rent, Insurance, etc., etc., and for variable expenses which bear upon the factory generally, such as Power, Light, and Heat.

Cost Sheets: For costs of maintenance, repairs and renewals.

Special Factory Reports: For indirect costs in connection with defective and experimental work, over short and damage, inward freight and cartage, etc., etc.

The variety of the sources from which overhead expenses are collected, furnishes a very strong reason for insisting that the greatest possible degree of care must be exercised in distinctively distinguishing direct and indirect charges upon each form of report used.

QUESTIONS FORMING THE SEVENTH EXAMINATION.

1. In what manner would you deal with the following factory expenditures:
 - (a) Rent, \$750.00, paid January 2, 1920, for 3 months in advance.
 - (b) Rent, 750.00, paid January 2, 1920, for 3 months in arrears.
2. Show the entries in the Cash and Ledger accounts for rent, as they should properly appear after the transactions under (a) and (b) of question No. 1 have been recorded. Explain how the charges for rent to cost periods, would have been made.
3. Assume the annual rent of a factory to be \$3000.00, the area covered by the rent being 15,000 square feet. If department A uses 2500 square feet, department B uses 3500 square feet, and department C uses 5000 square feet, what proportion of the annual rental (shown by the use of a formula in each case) is chargeable to A, B, and C. No considerations other than those stated, are involved.
4. If a factory commences business with new machinery costing \$25,000.00, and the cost of maintenance is determined to be 5 per cent per annum, and it is also estimated that the machinery will work during the first two years without incurring any maintenance expenses, how would you deal with maintenance during the first two years?
5. In what manner may the following factory expenditures be satisfactorily apportioned, as direct department expenditures:
 - (a) Fire Insurance?
 - (b) Liability Insurance (Workmen's Compensation)?
 - (c) Real Estate Taxes?
 - (d) Property Taxes?

6. If department D requisitions supplies sufficient for 3 months, from the general store room, how would you ascertain the cost of supplies used?
7. If a non-productive factory department has incurred direct costs of \$1500.00, and general overhead costs \$150.00 are apportioned to the department, what part of these costs should be distributed to the productive departments of the factory, and why?
8. What is the philosophy upon which the following methods of overhead distribution is based:
 - (1) Prime cost method?
 - (2) Productive labor cost method?
 - (3) Productive labor hours method?
9. If the product of a factory is manufactured under considerable variations as to material costs, and as to hand labor costs, which of the methods referred to in question No. 8 would you advocate as giving the most accurate results in distributing overhead, and why?
10. When machinery is largely used in the productive process of a factory, what are the advantages gained by a machine rate method of distributing overhead?
11. From the following details prepare formulas showing the rates to be used for distributing the overhead of each department, and for distributing the general factory overhead to the departments.

Each distribution is to be shown by the two methods:

- (1) The productive labor cost method.
- (2) The productive labor hours method.

Overhead Charges	Departments			General Factory Overhead
	A	B	C	
Misc. Factory Expenses	\$ 12.00	\$ 8.00	\$ 6.00	\$ 10.20
Wages of Foreman	200.00			
Factory Supplies	49.12	37.20	26.10	
Indirect Material				217.00
Superintendence				300.00
Factory Rent	125.00	100.00	75.00	
Insurance	20.00	15.00	10.00	
Depreciation	35.00	25.00	20.00	
Total Overhead	<u>\$441.12</u>	<u>\$ 185.20</u>	<u>\$ 137.10</u>	<u>\$ 527.20</u>
Productive Labor Cost	<u>\$3150.00</u>	<u>\$1720.00</u>	<u>\$1500.00</u>	Total <u>\$6370.00</u>
Productive Labor Hours	<u>6300</u>	<u>5000</u>	<u>4800</u>	Total <u>16100</u>

12. If a machine rate method of distributing overhead is employed, what essential principle is it necessary to recognize in installing the method?
13. What is the most satisfactory plan to adopt for reporting factory, or department overhead expenses, in order to facilitate the charging and distribution of such expenses?

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STANDARD BASIC COURSE

EIGHTH LESSON

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EIGHTH LESSON

SUBJECTS: METHOD OF REPORTING PRODUCTION. USE OF COST SHEETS.

(Collateral reading, chapters 13 and 14.)

Production Reports:

A production report primarily serves the purpose of advising the completion, or present condition, of a particular product. The report may take the form of a simple notification, such as, an endorsed copy of a factory order returned to the Office, or the report may be detailed for the purpose of recording costs.

A production report also serves the purpose of presenting information which shows the periodical output of a factory, enabling comparison to be made for different periods, and comparison of the productive activities of various departments.

At the end of each cost period, a summary of production reports distinguishes the various classes of production, such as, good, defective, repair work, construction work on factory equipment, etc., thereby providing a basis from which the various departments are to be credited for the cost of work done, and the stores—or other disposition of the product—charged.

Accuracy in stating quantities of product is a requirement which cannot be too strongly emphasized. Inaccuracies lead to errors upon the Store room records, and in the unit cost of the product.

Methods of Reporting Production:

If a production report is to be used as a report of product only, without reference to costs, it must report such of the following conditions as are applicable to the working conditions:

Order Number, operation, process, department, quantity, and description. In this case, the reported details would be noted upon the summary sheets, cost sheets, and store records—if the product is sent to the stores.

If a production report is to be used for recording costs, it must give the following additional information:

Details of Materials used, cost of materials used, direct labor cost, overhead cost, total cost.

In this case the production report would virtually be a cost sheet.

In cases where a product is progressively operated upon by more than one department, before it assumes a finished form, a separate production report may be required from each operating department, whether quantities of product only are reported, or the costs are also reported, a summary of the separate reports would then give the total production in the one case, and the total production and cost of production in the other.

If, however, a production report is to serve as a record of costs, one form of report may be used, which will show the accumulated costs of the first opera-

tion to be carried forward to the second operation, the accumulated costs of the first and second operations to be carried forward to the third operation, and so on, until the product has passed through all operations and is finally disposed of as finished product. The following illustration shows how the costs of progressive operations would be accounted for upon a single report:

Dept.	Costs		Operating	Department
	Departmental	Accumulated	Debits	Credits
A	\$2,010.80			\$2,010.80
B	1,090.20	\$2,010.80	\$2,010.80	3,101.00
C	760.30	3,101.00	3,101.00	3,861.30
D	340.70	3,861.30	3,861.30	4,202.00
Total	<u>\$4,202.00</u>			

The Student will observe that the costs applied to the product by each department are shown as departmental costs, which appear as accumulated costs to each ensuing department.

The debits and credits to the operating departments show in each case a net credit for the cost of the work done, the final offsetting debit being made to the stores—in the case of finished product sent to the store room—or to cost of Sales if the product is shipped. In the illustration shown above, department D is assumed to finish the product, therefore, the credit to department D (\$4,202.00) would be offset by a charge of the same amount either to the finished stores, to cost of Sales, or to whatever disposition was made of the product.

Clerical detail may be avoided, in many cases, by using various factory reports as production reports, particularly where the factory report must necessarily report quantity of product. For instance, Labor reports must state quantity of production when the wage system is other than the day rate, and defective work reports are usually required to show all the details necessary for a production report.

Cost Sheets:

The cost sheet is the most important record in any cost accounting system. It collects the various elements of cost which are to be charged as the factory cost of the product, thus guiding the management in determining minimum selling prices, and in indicating the more profitable lines of the product. Accuracy of result is altogether dependent upon accuracy in stating quantities and costs, we therefore, reiterate our previously express admonition respecting the absolute necessity for accuracy.

The essential differences between Cost sheets used for the order and process methods of cost finding must be clearly understood. Cost sheets, used for the order method of cost finding deal with the entire order as the unit, presenting the costs for each distinct process or operation involved in the work. Even though the order covers a number of similar articles (not standard product of the factory) the cost sheet would deal with the total number of articles, not with each article, as the unit. The average cost of each article would then be ascertained by dividing the total cost of the order by the number of articles produced.

The material, labor, and overhead reports, from which the cost sheets are compiled would deal with the entire order as the unit, hence the cost sheet would be designed to conform.

Cost sheets used for the process method of cost finding deal with a unit of the volume produced, which may be represented by count, weight, or measurement. The product may pass through several processes, in which case the cost sheets must show the quantity produced, and its cost, for each process. The unit cost of each process would be ascertained by dividing the process cost by the number of units produced by the process, and the total unit cost would be ascertained by dividing the total cost of all processes by the number of units in the finished product.

All factory reports designed to meet the requirements of a process method of cost finding, from which process cost sheets are compiled, would deal with the process as the unit, hence the cost sheet would be designed to conform.

It should now be apparent to the Student that the Cost sheet is in reality a sheet upon which the various factory reports of materials, labor, and overhead costs are collected for the purpose of ascertaining the cost of finished parts, or total cost, of any order, process, job, or article, and that the form of the cost sheet must conform to the purpose which it is required to serve.

QUESTIONS FORMING THE EIGHTH EXAMINATION.

- I. (Problem) Prepare a cost sheet, showing the cost of order No. 1000, for construction of a spur track. The length of way is 1700 yards, double track, standard wide gauge. Specifications are assumed to be attached.

The operations are to be classed as Surfacing, Grading, Ballasting, Track Laying.

The overhead expenses were \$5,000.00 to be distributed to the classifications on the basis of the productive labor hours of each.

Construct the cost sheet, showing the cost for each classification of operation, from the above stated details, and from the following material requisitions (all materials assumed to have been used) and labor reports.

Consider the question (problem) thoroughly before formulating your answer for solution.

MATERIAL REQUISITIONS.

No. 1—May 6, 1920—Ballasting—Order No. 1000—250 tons rock ballast—\$3.00 per ton.

No. 2—May 9, 1920—Ballasting—Order No. 1000—³⁰⁰250 tons rock ballast—\$3.00 per ton.

No. 3—May 11, 1920—Track Laying—Order No. 1000—1800 redwood ties @ \$90.00 per 100. 100,000 lbs. 16 lb. steel rails @ \$95.00 per 1000. Joints, Plates and Spikes, cost \$320.00.

No. 4—May 16, 1920, Track Laying—Order No. 1000. 50,000 lbs. 16 lb. steel rails @ \$96.00 per 1000. *Joints, Plates & Spikes cost \$160.00*

No. 5—May 21, 1920, Track Laying—Order No. 1000. 13,200 lbs. 16 lb. Steel Rails @ \$96.00 per 1000. Joints, Plates and Spikes, cost \$42.50.

No. 6—May 25, 1920. Track Laying—Order No. 1000. 50 lbs. Track Grease @ .30 per lb.

LABOR REPORTS.

No. 1—May 1, 1920, Order No. 1000—For week ending May 1st, 20 men surfacing, 1 week (48 hours each) @ \$16.00 per week.

No. 2—May 8, 1920, Order No. 1000—For week ending May 8, 80 men surfacing, 1 week (48 hours each) @ \$19.50 per week.

No. 3—May 10, 1920, Order No. 1000—For week ended May 10—50 men Grading—1 week (48 hours each) @ \$17.00 per week.

No. 4—May 15, 1920, Order No. 1000—For week ended May 15, 40 men Ballasting—1 week (48 hours each) @ \$16.00 per week.

No. 5—May 20, 1920, Order No. 1000—For week ended May 20, 50 men Track Laying—1 week (48 hours each) @ \$24.00 per week.

No. 6—May 27, 1920, Order No. 1000—For week ended May 27—40 men Track Laying—1 week (48 hours each) @ \$24.00 per week.

2. When any wage system, other than a day rate system, is in use, would a labor report for such a system serve as a production report? If so, why?
3. From what sources are the details obtained for compiling a cost sheet?
4. What do you understand to be the difference between a cost sheet used for the order method of cost finding, and a cost sheet used for the process method of cost finding.
5. Give a concise explanation of the purpose for which a production report is required.
6. A report is received by the Cost department showing that department A has completed factory order No. 1268, but no details are given as to the costs of the order. Is the report a production report? Give reasons for your answer.
7. Why is it necessary for production reports to indicate the disposition that has been made of the product, when the reports are used directly for crediting departments with the work reported thereon?

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STANDARD BASIC COURSE

NINTH LESSON

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NINTH LESSON

SUBJECTS: STOCK RECORDS—CHARGING FACTORY EXPENSES.

(Collateral reading, chapters 15 and 16.)

Stock Records:

The student has learned that a perpetual inventory is one of the important advantages to be derived from a detailed cost system. He also knows that the various stock records (Raw materials, work-in-process, finished product, finished parts, and miscellaneous stock) supply the details which represent a perpetual inventory, the importance of accurate material reports, both as to materials received, materials used, and production completed, is obvious. It is equally obvious that accuracy must characterize the entries made upon the stock records from the various material and production reports.

Stock Records must always be considered with respect to the service they are to render in connection with the inventory. The foremost consideration is classification, which should extend to each important distinctive class of raw material and product. Each classification of raw material and product should appear separately upon the stock records and separate sections of the store rooms should be allotted to them.

In the appropriate sequence of future lessons, the student will learn how the various classifications shown by the stock records, are controlled upon the factory and general accounts. Our present purpose in referring to classifications, being to prepare him for a better understanding of the subject of control, when that subject is reached.

As previously stated, the perpetual (o book) inventory is taken from the stock records, it therefore follows that differences between the perpetual (Book) inventory and a physical inventory (an inventory from inspection of stock actually on hand) will be more readily traced if the inventory shown by the stock records is appropriately classified.

In previous lessons we have referred to inventory tests as a means of physically verifying the stock records at various times between the taking of physical inventories. At this point, we strongly emphasize the importance of such tests for the purpose of minimizing the liability of errors necessitating adjustments upon the records. Inventory adjustments which involve appreciable amounts, are a direct reflection upon cost accounting methods.

It is generally the case that some part of a merchandise inventory is constantly changing, other parts change very little, whilst other parts do not change at all, that is, the stock is obsolete.

In the case of constantly changing stocks, the stock records must show a running balance of quantities on hand. This information may be required by the purchasing department at any time.

Ability to supply the information will depend upon the promptness with which the receipts and withdrawals are entered upon the stock records.

Provision should be made upon the stock records for keeping active, inactive, and obsolete stocks in separate sections. This will greatly facilitate effective

tive measures for handling each one of these classes, which could not result if they were indiscriminately mixed upon the records.

By way of further emphasizing the necessity for accurately conducted stock records, the student is to be reminded of the relation existing between the stock records and the various factory reports from which the cost sheets are compiled. The stock records are largely constructed from Reports of Materials received, Material Requisitions, Reports of Materials used, Reports of Materials transferred between departments, etc. The material costs finally entered upon the cost sheets are obtained from the stock records.

It will also be apparent that the variety of sources which contribute details for entry upon stock records, require a systematic method of procedure in handling them. Effective records must be kept in a state of constant completion.

Charging Factory Expenditures:

The term "Factory Expenditures" as herein used, means all expenditures chargeable directly or indirectly to the factory product, they will therefore be represented by expenditures for Materials, Labor and overhead expenses.

The term, "Charging Factory Expenditures" means applying the expenditures to the factory product, as its cost. The procedure required for this purpose must also serve to connect the manufacturing accounts with the general financial accounts of the factory.

Both objects are accomplished by the use of summarizing records, upon which all cost details for a cost period are summarized, the respective totals being used as controlling the factory accounts. The cost period, here referred to, is an equal fractional part of a year, into which the accounting system of the factory is divided, such as a calendar month, or, preferably—the period covered by a pay-roll.

Any cost system which is based upon records that are not co-ordinated or made part of the general financial system, will fail to accomplish its purpose, no matter how elaborate the records may be.

Briefly stated, the object accomplished by the use of summarizing records is the collecting (in one total for each) of similar classes of expenditures during a cost period. The cost sheets for the same period would—if summarized in like manner—present the same result, but, cost sheets would not be available for the purpose until all entries for the period were made, the work involved would therefore be represented by an accumulation—and at a time—which it would be extremely difficult to deal with. Furthermore, the cost sheets are in constant use, consequently, their use for summarizing purposes would conflict with their current use.

The summarizing records are compiled from the same sources as are the cost sheets, therefore, in cases where cost sheets have been compiled from factory reports (that is, factory reports which have not also served the purpose of a cost sheet) the summarizing records act as a check upon the accuracy of the cost sheets. In a small business, the cost sheets might be used for summarizing purposes.

As previously stated, the ultimate object of summarizing records is to connect factory costs with the factory general financial accounts. The object is accomplished in the following manner:

The summarized totals of all costs would be severally charged to "Work in Process", credit being given to the accounts which control material costs, the

pay-roll account for labor costs, and the various accounts which control the indirect expenses, or overhead. "Work in Process" would be credited with the summarized totals of the elements of cost (materials, labor, and indirect or overhead expenses) which entered into the cost of finished product or product withdrawn from operation, the latter being debited. Cost of Sales would be charged, and the appropriate Stores classification credited with the cost of product sold. This procedure will be made clear by the following illustration:

Assuming the summarizing records for a cost period to show:

Cost of Materials put into operation		\$10,000.00
Cost of direct labor	\$5,000.00	} Pay Roll
Cost of indirect labor	750.00	
Other overhead expenses		1,250.00
Finished Product Put in Stores		8,500.00
Material Cost	5,000.00	
Direct Labor Cost	3,000.00	
Overhead Cost	500.00	
	<u>\$8,500.00</u>	
Finished Product Directly Shipped		6,800.00
Material Cost.	\$4,000.00	
Direct Labor Cost.	1,800.00	
Overhead Costs.	1,000.00	
	<u>\$6,800.00</u>	

From the foregoing details, the requisite accounts for controlling the expenditures, and for connecting them with the general financial accounts would appear upon the ledger as follows:

Ledger Accounts	Dr.	Cr.
Work in Process Materials		
Materials put into operation	\$10,000.00	
Material cost of finished product		\$5,000.00
Material cost of product shipped		4,000.00
Balance		1,000.00
	<u>\$10,000.00</u>	<u>\$10,000.00</u>
Work in Process Direct Labor		
Direct Labor, per summary	\$5,000.00	
Direct Labor, product put in store		\$3,000.00
Direct Labor, product shipped		1,800.00
Balance		200.00
	<u>\$5,000.00</u>	<u>\$5,000.00</u>
Work in Process Overhead	\$2,000.00	
Indirect Labor	\$ 750.00	
Other overhead expenses	1,250.00	
	<u>\$2,000.00</u>	
Overhead, finished product put in store		\$ 500.00
Overhead, finished product shipped		1,000.00
Balance		500.00
	<u>\$2,000.00</u>	<u>\$2,000.00</u>

Pay-Roll (General Ledger)		
Pay-roll for the period		<u>\$5,750.00</u>
Overhead Expenses (General Ledger)		
Other overhead expenses		<u>\$1,250.00</u>
Stores (Materials)		
Materials, per summary		<u>\$10,000.00</u>
Finished Product		
Put in stores	\$8,500.00	
Directly shipped	<u>6,800.00</u>	\$15,300.00
Cost of Sales (directly shipped)		\$6,800.00
Balance		<u>8,500.00</u>
	<u>\$15,300.00</u>	<u>\$15,300.00</u>
Cost of Sales (General Ledger)		
Cost of product shipped	<u>\$6,800.00</u>	
List of the Foregoing Ledger Balances		
	Dr.	Cr.
Work in Process—Materials	\$1,000.00	
Work in Process—Labor	200.00	
Work in Process—Overhead	500.00	
Stores (Materials)		\$10,000.00
Finished Product (Stores)	8,500.00	
Cost of Sales (General Ledger)	6,800.00	
Pay-roll (General Ledger)		5,750.00
Overhead (General Ledger)		<u>1,250.00</u>
	<u>\$17,000.00</u>	<u>\$17,000.00</u>

With the foregoing illustration before him, the student will observe that the total Material, Direct Labor, Indirect Labor, and other Overhead costs are charged to "Work in Process," a separate account being provided for each element of cost which is in process. The three separate accounts may be provided upon a single ledger folio, by appropriate divisional rulings.

Credit is given to each "Work in Process" account for the cost of each element which entered into the finished product, therefore, the balances of "Work in Process" show the inventory of incompleted work when taken collectively, and individually they divide the inventory into the elements of cost.

The credit to stores for materials put in operation, would of course reduce the stock of Raw Materials on hand.

The debit balance for "Finished Product" (Stores) represents the inventory of finished product on hand.

The debit balance for "Cost of Sales" (General Ledger) covers the factory cost of product shipped. Financial transactions with customers are conducted through the general accounts, therefore, the debits to customers and credit to a "sales" account would appear in the General Accounts for the selling value of product shipped. Assuming a separate ledger is in use for the factory accounts (Factory Ledger) and the general accounts to be contained in a "General Ledger" the cost of sales (\$6,800.00) would appear upon the "General Ledger" as a debit to "Cost of Sales" and the same amount would appear at the credit of an account, "Factory Ledger," the latter account controlling (in the General Ledger) the Factory Ledger. The credit balances for Pay Roll (General Ledger)

and Overhead (General Ledger) would be charged to "Factory Ledger" account (in the General Ledger) at the time the expenditures were made from the General cash account.

In the Factory Ledger, the above stated balances would appear as a debit to an account "General Ledger" for Cost of Sales, and credits to the same account for Pay-roll and overhead expenses.

It will now be seen that the controlling accounts "Factory Ledger" upon the General Ledger, and "General Ledger" upon the Factory Ledger must always be in agreement as to amount, and that the balances will be on opposite sides of the Ledgers, the control in the General Ledger showing a debit balance, and the control in the Factory Ledger showing a credit balance.

The purpose of the illustration is to present to the student, in the most simple form possible, the following accounting procedure:

- (1) The method by which the details shown by summarizing records are entered upon the factory accounts.
- (2) The method by which the factory accounts are connected with, or made part of, the general accounts.
- (3) The method by which factory accounts are controlled.

The ability of the student to deal with practical questions and problems, which will form part of ensuing lessons, will largely depend upon a thorough comprehension of the accounting principles involved in the illustration, we therefore request him to study it thoroughly.

QUESTIONS FORMING THE NINTH EXAMINATION.

1. Suppose the business of a factory to be conducted under an admirable system of detailed reports, but the reports are merely used for statistical purposes, that is, they are not incorporated with the general accounts. Under these circumstances what are the disadvantages experienced by the management?
2. What does the term "Cost period" mean, and what is the best duration for a cost period?
3. Explain concisely the principal feature of difference between a Purchase Record and a Voucher Record.
4. What condition may make it necessary to use a Distribution Record in conjunction with a Purchase Record or Voucher Register?
5. If a distribution record is used, how would postings be made from it?
6. Under what condition is it necessary to prepare an analysis of a payroll?
7. What is the purpose of a Pay-roll Analysis?
8. What factory records other than the Ledger, show the Inventory of Work-in-Process?
9. Should the factory records, referred to in Question 8 at all times agree with the Ledger Account of Work-in-Process, or is the agreement affected at a particular time only? If so, at what particular time?
10. Referring to the Purchase Record, form 50, page 246 of the collateral reading, in which column would you enter an invoice for \$350.00 cash advanced on a letter of credit for the account of your company?

11. In which column of the Voucher Register, form 52, page 252 of the collateral reading, would you enter the \$350.00 referred to in question 10.
12. Assume the following invoices to have been received.
- | | |
|--------------------------------------|----------|
| (1) Circulars for Sales Department | \$120.00 |
| (2) Letter-heads for General Office | 50.00 |
| (3) White rag waste for factory | 30.00 |
| (4) Wool, for manufacturing purposes | 875.00 |

In which columns of the Purchase Record and the Voucher Register would you enter the amounts, forms 50—page 246, and 52—page 252 of the collateral reading, being the forms used respectively as a Purchase Record, and as a Voucher Register?

13. Explain how the totals for each of the distribution columns in the forms of Purchase Record and Voucher Register (referred to in question 12) would be resolved into the various sub-classifications required at the end of each cost period. The question extends also to the entries made under the headings "Miscellaneous Accounts."

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TENTH LESSON

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THIS LESSON

TENTH LESSON

SUBJECTS: RECORDING TRANSFERS WITHIN THE FACTORY
RECORDING SALES AND COST OF SALES.

(Collateral reading, Chapters 17 and 18.)

The purpose of summarizing records were illustrated in the preceding lesson, and attention was given to the charging of all factory expenditures which entered directly or indirectly into the cost of the product. Consideration must now be given to the form, and individual use of the summarizing records, and their application to transfers within the factory.

In every factory, some—in many cases all—of the summarizing records, hereafter described, will be required. The movements of materials must be followed and accounted for, and the costs of production ascertained. The accomplishment of these purposes is the objective of summarizing records.

The summarizing records which deal with material, are as follows:

Summary of Material Requisitions:

Each form should be consecutively numbered, and dated in conformity with the cost period. The form should provide a column for the numbers shown upon the material requisitions, which should be entered on the form in numerical order, thus ensuring that each requisition has been accounted for. The values shown upon each requisition should first be entered in a "total" column, then extended to a column to be headed with the classification applicable to the material.

The additions of the completed summary are then subject to proof, by comparing the total of the "total" column with the combined totals of the various classifications.

Material requisitions will usually cover, Direct and Indirect Material, Supplies applicable to Factory Overhead, Supplies applicable to the Selling and Administrative Departments, and Materials and Supplies for sub-stock rooms.

As the purpose of the summary is to determine the amounts which are to be credited to the accounts which control materials and supplies, and the amounts which are to be charged to the various departments for materials and supplies used, the details of direct materials, indirect materials, supplies applicable to factory overhead, to the selling department, and to the administrative department, must be shown in separate columns upon the summary, so that the totals of each may be ascertained. Separately summarized totals would also be required of material transferred to sub-stock rooms, or to operating departments, in quantities not currently chargeable to the product.

Entries upon the summary should be made after the requisitions have been priced and entered upon the stock records, care being taken to see that all requisitions have been accounted for.

In our reference—immediately preceding—we alluded to materials, or supplies, transferred to sub-stock rooms, or to operating departments. The materials or supplies actually used therefrom will be obtained from "Reports of Departmental Material, or Supplies Used," to be prepared by each department.

These reports require summarizing in order that charges to the product, and credits to the sub-stores, or department stores, may be made.

Summaries of Stock Transfers:

Transfers of Materials, or supplies, from one principal stock room to another, or to a sub-stock room, or to an operating department, or from one operating department to another, should be covered by appropriate requisitions, a summary of which should give the details necessary for adjusting the various stores accounts.

Summary of Labor Transfers:

This summary is required when workmen are temporarily detached from the department in which they are usually employed and assigned to work in another department. In such cases, the position of the workman upon the Pay-roll would remain unchanged, the summary is therefore required for the purpose of adjusting the cost of his labor, as between the department which is charged from the pay-roll, and the department for which he temporarily worked. Labor transfers would be entered upon the summary from "Labor Transfer Reports" which should be issued when the transfer is made. The report—as issued—would give the workman's pay-roll number, his name, the department from which, and to which he was transferred, and the date of the transfer. The Labor Reports covering his temporary employment should show that he was temporarily transferred under "Labor Transfer Report" No.(giving the number) in addition to the information usual to labor reports.

Summary of Shop Order Costs:

Shop order costs deal with the cost of repairs and maintenance within the factory. Such costs are therefore overhead charges to the departments which are benefitted by them. Upon the summary they must be separated from production costs. It is rarely the case that repair and maintenance work is done by the department for which it is required, the summary, however, will enable a proper adjustment as between the department which does the work and the department for which it was done.

The summaries are consecutively numbered, and dated for each cost period, and provide details showing the number of the factory order, or standing order, which authorized the work, the amounts for material, labor, and overhead to be credited to the department doing the work, and to be concurrently charged to the particular repair and maintenance account for which the work was done. They are generally prepared from cost sheets of repair work, the caption of the columns indicating the accounts to which postings are to be made.

Summary of Costs for Defective Work:

This summary is required for the purpose of crediting the department which operated upon the defective product, and charging the appropriate account involved. The summary is prepared from cost sheets which cover operations upon defective product.

Summary of Factory Overhead Distribution:

The items of factory overhead which are to be summarized, are obtained from the Purchase Record (if used), Voucher Register (if used) Pay-roll or pay-roll analysis, and from the other summarizing records which may show charges for overhead.

When completely summarized, postings may be made to the various factory accounts affected, and from those accounts the summary of Factory Overhead Distribution may be prepared, the procedure being:

Ascertaining the amount chargeable to non-productive departments.

Distributing the overhead of each non-productive department to the productive departments.

Ascertaining the overhead of productive departments in order that the departmental accounts of work in process may be charged.

The distributed overhead may be shown upon consecutively numbered forms, for each department, a description of the items being listed, and the amounts of each item extended to a column for each cost period of a year. The overhead expenses of each department will then be in comparative order, by cost periods, increases or decreases being instantly apparent.

Summarizing the Sales and Cost of Sales:

These summaries are respectively required as a means of controlling the customers accounts upon the General Ledger, and crediting the factory for the cost value of product sold. The summary of sales records each sales invoice (consecutively numbered) so that the total of all sales invoices, for a cost period, may be charged to "Accounts Receivable" upon the General Ledger, this account controlling the Individual Ledger, in which each customer's account is kept. The summary provides columns for the number of the sales invoice, amount of the sale (in column headed "Charge Accounts Receivable") each account being then extended to a column headed with the classification of the product sold.

Postings would be made from the summary by charging the controlling account, "Accounts Receivable" and crediting each sales classification with the totals shown in the respective columns.

The summary of Cost of Sales shows the factory cost of each sales invoice. Postings would be made by charging "Cost of Sales" and crediting "Finished Product," under the appropriate classifications, with the total of each classification under which the sales were recorded.

Summarizing Credit Memoranda:

The return of merchandise by customers, necessitates the issuing of a "credit memorandum" which sets forth all the accounting details of the credit to be made to the customer. Each credit memorandum necessitates the preparation of a "Cost of Returns Record" which shows the factory cost of the merchandise returned.

A separate summary of credit memoranda, and of cost of returns records will be required. The former is used for adjusting the customers account, and the latter for adjusting the account of finished product in the stores. Posting from the summaries would take the following course:

The total of returns is credited to the controlling account, "Accounts Receivable," the total of each column which classifies the returns being charged to the sales account of same classification, which received credit for the merchandise sold. It will be observed that the summary of returns must provide the same classifications as the summary of sales.

The cost of each class of return is charged to the finished stock account for the same classification, and credited to the similar classification of Cost of

Sales. It will be observed that the summary of the "Cost of Returns Records" must show the same classifications as the summary of "Credit Memoranda."

In a previous lesson, we emphasized the importance of preventing fluctuations as far as may be possible. If credit memoranda, for any cost period, represents an abnormally high percentage of returns, by reason of large returns from the sales of prior cost periods, fluctuations will be avoided by adjusting—if practicable—the prior accounts affected, to the end that a particular cost period may bear only the adjustment incidental to it.

If such adjustments are not practicable, by reason of the ledger balances having been definitely closed, abnormally large returns should be sufficiently explained on any financial or statistical statement which may be prepared.

In the case of allowances (not involving returns) being made to customers, the credit memoranda issued therefor should be separately summarized. If allowances are abnormally large, an effort should be made to connect them in the accounts with the sales accounts, in respect of which they were made by holding them in specially designated allowance accounts. Otherwise, allowances would be charged to a current Allowance Account. In either event, allowances will usually appear in the accounts as deductions from income, not as factory cost. Postings from credit memoranda issued to customers are made by crediting the controlling account "Accounts Receivable" and charging an allowance account.

QUESTIONS FORMING THE TENTH EXAMINATION.

The next lesson will be devoted to the co-ordination of Factory Accounts with the accounts in the General Ledger. In order that the student may thoroughly comprehend the subject, we advise a careful review of the collateral reading to and including Chapter 18.

- I. A customer's order has been received for the undermentioned articles, from stock:

ARTICLES		Selling Value	Cost Value
2 doz. Mantel Clocks	No. 10176—Class A	\$120.00	\$ 80.00
3 doz. Auto Clocks	No. 1762—Class B	108.00	75.00
6 doz. Alarm Clocks	No. 8492—Class C	144.00	105.00
Weights & Chains for Floor Clock	No. 127—Class A	32.00	17.00
1 doz. Alarms, Luminous	No. 5350—Class C	30.00	16.00
2 only Travelers 8 day	No. 1050—Class A	12.00	8.00
Total		<u>\$446.00</u>	<u>\$301.00</u>

Conditions:

Customer, Jenkinson and Smith, Brooklyn, N. Y. Their order No. 1172—shipping order No. 1000, dated May 1, 1920—to be shipped by N. Y. C. R. R Freight (\$6.25) to be prepaid and charged to customer. Shipment made May 2, 1920, 4 packages weighing 500 lbs. Shipping Clerk, John Jones, Invoice No 1876, was rendered May 2, 1920—terms net 30 days. The order was packed by H. Quinn. Class A, B, C represent three product classifications.

The student is requested to prepare from the above stated details, a shipping order, a billing record (Invoice), a record of cost of sales, and a combined summary of Sales and Costs.

The required forms are to be as simple in design as possible, each form, however, is to clearly and practicably show all the essential details.

At the present stage of the student's progress, the question of preparing such forms by any of the multiplex methods now in use, is subordinate to a clear understanding of the details which each form should present, hence our request that the forms required in connection with question I shall be as simply constructed as possible.

2. If an inventory test disclosed an abnormally large difference between material on hand, and the quantity shown to be on hand by the Stock Records (perpetual inventory), what line of investigation would you pursue?
3. Referring to a Purchase Record or Voucher Register, how would you post the following details:
 - (1) Total Purchases.
 - (2) Each classification of the Purchases.
 - (3) Purchases entered in the miscellaneous column?
4. What would you expect a summary of material requisitions to show, when issued against the main stores of a large factory?
5. What is the purpose served by a summary of Department Material used?
6. If material requisitions and Reports of Materials Used cover the same material, how would you guard against charging the Material to the product twice?
7. If transfers of Materials, made from one store room to another, are covered by material requisitions, is it necessary to prepare a separate summary record of such transfers? If so, why?
8. Should shop order costs for repairs and maintenance be summarized separately from production costs?
If so, why?
9. What is the purpose of a summary of Defective Work Costs?
10. What is the difference in the objects accomplished, between a Report of Material Used, and a Report of Departmental Material used?
11. State briefly, what is accomplished by a summary of factory overhead, and a summary of factory overhead distribution.

1. The first part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

J. LEE NICHOLSON INSTITUTE OF COST ACCOUNTING

STANDARD BASIC COURSE

ELEVENTH LESSON

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Chicago

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LESSON 15 - THE INVENTORY

*This lesson is received by the student
upon condition that the same is not
to be made the subject of any sale,
gift or loan, to any person or persons.*

W. L. NICHOLSON

ELEVENTH LESSON

SUBJECT: CONTROLLING THE COST RECORDS, BY ACCOUNTING FOR FACTORY COSTS IN THE GENERAL LEDGER.

(Collateral reading, Chapter 19.)

The Student has progressed to the point of understanding the uses of various forms of Factory Reports, the necessity for summarizing the reports, and that the Summaries present the details necessary for the purpose of combining the factory costs with the General Accounts. The method by which the combination is effected forms the subject of the present lesson.

The Cost records show the details of each transaction which enters into factory costs, whilst the summarizing records are constructed with the object of ascertaining the total of each classification of the Cost records for a given cost period. The totals thus obtained are used for the purpose of combining the cost records with the general accounts, and placing the factory records under an accounting control.

Accounts are controlled, when their various details, which usually appear in a separate book of accounts, or upon a separate set of accounting records, are represented by a single account in another book of accounts, the single account being the controlling account. The Controlling account would show, by a single balance, the net aggregate of all the balances which appear upon the controlled books, or records.

The Student must possess a clear understanding of what is accomplished by a controlling account, and the method by which such an account is constructed from the summarizing records. In order that these matters may be clear to him, we present the following illustration of a trial balance of a General Ledger before the summarizing records, for a cost period, have been posted, the details which are to be posted, and the trial balance after the postings have been made. Before proceeding with a detailed examination of the illustration, we make the following explanation:

- (a) Our object in presenting the illustration, in the manner shown, is to distinctly exhibit the relation of the summarizing records to the general accounts, and to show how the factory accounts are controlled. In order to accomplish this purpose, the balances of General Ledger Accounts, at April 30, 1920, which are not affected by the summarizing records—although changed in amount—are fictitious.
- (b) In order to simplify the illustration, we have confined it to a few accounts. Inventories of work in process, and finished product, have been omitted. The entire product is assumed to have been sold, no sales having been made from stock.
- (c) Posting from the summarizing records will be fully understood—without our actually showing them—by noting the changes between the commencing and ending trial balances, set out in the detailed explanations which follow. The items added represent debits, and the items deducted represent credits.

Trial balance of General Ledger, at April 30, 1920
(Before posting Summarizing records for April)

Account	Classification	Dr.			Cr.		
Cash		\$28	750	97			
Notes Receivable		25	949	03			
Accounts Receivable		162	847	23			
Merchandise Inventory, April 1st	Store A.	101	917	80			
" " " "	Store B.	60	433	40			
" " " "	Store C.	68	377	90			
"(sub-store)" " "	Dept. E.	1	220	10			
" " " "	Dept. F.		750	00			
" " " "	Dept. G.	3	040	20			
Machinery and Equipment		39	427	18			
Accounts Payable					\$68	422	19
Notes Payable					19	210	20
Capital Stock					330	000	00
Surplus					65	000	00
Undivided Profits, April 1st					11	917	61
Sales					90	218	60
Merchandise Purchases	Store A.	20	200	50			
" "	Store B.	18	800	50			
" "	Store C.	23	249	30			
Pay Roll (wages for April)		24	621	90			
Factory Overhead			92	59			
Selling Expenses		3	090	00			
Administrative Expenses		2	000	00			
		\$584	768	60	\$584	768	60

Table of General Ledger Accounts
 (Before Posting Summary to Balance Sheet)

Account

Balance

Debit

Credit

Assets

Liabilities

Equity

Income

Expenses

Net Income

Retained Earnings

Dividends

Depreciation

Accumulated Depreciation

Accounts Payable

Notes Payable

Prepaid Expenses

Capital Stock

Surplus

Income Statement

Balance Sheet

Statement of Cash Flows

Income Statement

Balance Sheet

Statement of Cash Flows

Administrative Expenses

Factory Accounts, for April, 1920. (To be controlled)

Summarizing Record	Classification		Details			Amount		
	Store	Product						
Summary of Material Requisitions								
Materials	A	1	\$10	120	19			
Materials	B	2	8	120	16			
Materials	C	3	13	140	70	\$31	381	05
Overhead Supplies	A	1		320	40			
Overhead Supplies	B	2		460	80			
Overhead Supplies	C	3		510	15	1	291	35
Summary of Pay-roll or Analysis								
Productive Labor Cost		1	8	240	20			
Productive Labor Cost		2	6	160	80			
Productive Labor Cost		3	10	220	90	24	621	90
Summary of Department Material Used								
Additional material from substores								
Material used from sub-store	E	1	1	220	10			
Material used from sub-store	F	2		750	00			
Material used from sub-store	G	3	3	040	20	5	010	30
Summary of Department Transfers								
Materials from Dept. A to Dept. C.				820	90		820	90
Summary of Sales Records								
Sales		1	30	500	00			
Sales		2	20	500	00			
Sales		3	39	218	60	90	218	60
Summary of Cost of Sales								
Cost of Sales		1	20	061	39			
Cost of Sales		2	15	534	00			
Cost of Sales		3	26	801	80	62	397	19
Summary of Factory Overhead Distribution								
Overhead Distributed		1		480	90			
Overhead Distributed		2		503	04			
Overhead Distributed		3		400	00	1	383	94

(continued)

Trial balance of General Ledger, at April 30, 1920
(After posting Summarizing records for April)

Account		Dr.	Cr.
Cash		\$32 360 48	
Notes Receivable		25 949 03	
Accounts Receivable		153 065 83	
Merchandise Inventories			
Store room A	\$110 856 81		
Store room B	70 652 94		
Store room C	78 797 25	260 307 00	
Machinery and Equipment		39 427 18	
Accounts Payable			\$62 250 30
Notes Payable			19 210 20
Capital Stock			330 000 00
Surplus			65 000 00
Undivided Profits, April, 1920			11 917 61
Sales			
Sales of Product No. 1			30 500 00
Sales of Product No. 2			20 500 00
Sales of Product No. 3			39 218 60
Selling Expenses		3 090 00	
Administrative Expenses		2 000 00	
Cost of Sales:			
Cost of Sales—Product No. 1		20 061 39	
Cost of Sales—Product No. 2		15 534 00	
Cost of Sales—Product No. 3		26 801 80	
		<u>\$578 596 71</u>	<u>\$578 596 71</u>

Statement of Assets and Liabilities

1912

(Contd.)

Total Assets
Total Liabilities

Method of Investment

Investment in
Government Bonds
Municipal Bonds
Corporate Bonds

Investment in Real Estate

Investment in Stocks

Investment in Bonds

Capital Stock

Surplus

Undistributed Profits

Total

Total of 1912

Total of 1911

Total of 1910

Total of 1909

Total of 1908

Total of 1907

Total of 1906

Total of 1905

Total of 1904

The following explanation will serve to make clear the effect of the summarizing records upon the commencing trial balance, as shown by the ending trial balance:

Account	Reason for change or for no change being made																																																																						
Cash	Changed by receipts and disbursements only. It is not a factory account.																																																																						
Notes Receivable	It is not a factory account.																																																																						
Accounts Receivable	Changed only by collections, or charges for Sales. It is not a factory account.																																																																						
Merchandise Inventories	<p>The changes—store room A—are accounted for as follows:</p> <table> <tr> <td>Inventory April 1, per 1st trial balance</td><td>\$101,917.80</td><td></td></tr> <tr> <td>Purchases per 1st trial balance</td><td>20,200.50</td><td></td></tr> <tr> <td>Total charges</td><td></td><td><u>\$122,118.30</u></td></tr> </table> <p>Credits:—</p> <table> <tr> <td>Per summary of Mat'l Reqs.</td><td>10,120.19</td><td></td></tr> <tr> <td>Per summary of Mat'l Reqs.</td><td>320.40</td><td></td></tr> <tr> <td></td><td><u>\$10,440.59</u></td><td></td></tr> <tr> <td>Per summary of Dept. transfers</td><td>820.90</td><td>11,261.49</td></tr> <tr> <td>Inventory, April 30th, per 2nd trial balance</td><td></td><td><u>\$110,856.81</u></td></tr> </table> <p>The changes—store room B—are accounted for thus:—</p> <table> <tr> <td>Inventory April 1, per 1st trial balance</td><td>\$ 60,433.40</td><td></td></tr> <tr> <td>Purchases per 1st trial balance</td><td>18,800.50</td><td></td></tr> <tr> <td>Total charges</td><td></td><td><u>\$ 79,233.90</u></td></tr> </table> <p>Credits:—</p> <table> <tr> <td>Per summary of Mat'l Reqs.</td><td>\$ 8,120.16</td><td></td></tr> <tr> <td>Per summary of Mat'l Reqs.</td><td>460.80</td><td>8,580.96</td></tr> <tr> <td></td><td><u></u></td><td><u></u></td></tr> <tr> <td>Inventory, April 30th, per 2nd trial balance</td><td></td><td><u>\$ 70,652.94</u></td></tr> </table> <p>The changes—Store room C—are accounted for thus:—</p> <table> <tr> <td>Inventory April 1, per 1st trial balance</td><td>\$ 68,377.90</td><td></td></tr> <tr> <td>Purchases per 1st trial balance</td><td>23,249.30</td><td></td></tr> <tr> <td>Transfer from Dept. A (per summary)</td><td>820.90</td><td></td></tr> <tr> <td>Total charges</td><td></td><td><u>\$92,448.10</u></td></tr> </table> <p>Credits:—</p> <table> <tr> <td>Per summary of Mat'l Reqs.</td><td>13,140.70</td><td></td></tr> <tr> <td>Per summary of Mat'l Reqs.</td><td>510.15</td><td>\$13,650.85</td></tr> <tr> <td></td><td><u></u></td><td><u></u></td></tr> <tr> <td>Inventory April 30, per 2nd trial balance</td><td></td><td><u>\$78,797.25</u></td></tr> </table>		Inventory April 1, per 1st trial balance	\$101,917.80		Purchases per 1st trial balance	20,200.50		Total charges		<u>\$122,118.30</u>	Per summary of Mat'l Reqs.	10,120.19		Per summary of Mat'l Reqs.	320.40			<u>\$10,440.59</u>		Per summary of Dept. transfers	820.90	11,261.49	Inventory, April 30th, per 2nd trial balance		<u>\$110,856.81</u>	Inventory April 1, per 1st trial balance	\$ 60,433.40		Purchases per 1st trial balance	18,800.50		Total charges		<u>\$ 79,233.90</u>	Per summary of Mat'l Reqs.	\$ 8,120.16		Per summary of Mat'l Reqs.	460.80	8,580.96		<u></u>	<u></u>	Inventory, April 30th, per 2nd trial balance		<u>\$ 70,652.94</u>	Inventory April 1, per 1st trial balance	\$ 68,377.90		Purchases per 1st trial balance	23,249.30		Transfer from Dept. A (per summary)	820.90		Total charges		<u>\$92,448.10</u>	Per summary of Mat'l Reqs.	13,140.70		Per summary of Mat'l Reqs.	510.15	\$13,650.85		<u></u>	<u></u>	Inventory April 30, per 2nd trial balance		<u>\$78,797.25</u>
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Account	Reason for change or for no change being made.								
Mdse. Inventories at Apr. 1st, sub-stores E, F and G.	The balances, per 1st trial balance were accounted for by the Summary of Department Material used, they do not, therefore appear on the 2nd trial balance.								
Machy. and Equipment	Is not a factory account.								
Accounts Payable.	Changed by payments to creditors and by credits for purchases. It is not a factory account.								
Notes Payable Capital Stock Surplus Undivided Profits	} Are not factory accounts								
Sales	The same amount is shown on both trial balances, the summarizing records, however, enabled a division of the Sales into the classifications product No. 1, product No. 2, product No. 3.								
Mdse. purchases	See Merchandise Inventories.								
Pay Roll	<p>The charge \$24,621.90, shown upon the 1st trial balance, has been accounted for as productive labor costs per summary of Pay Roll, or analysis thus:—</p> <table> <tr> <td>Product No. 1</td><td>\$8,240.20</td></tr> <tr> <td>Product No. 2</td><td>6,160.80</td></tr> <tr> <td>Product No. 3</td><td>10,220.90</td></tr> <tr> <td></td><td><u>\$24,621.90</u></td></tr> </table>	Product No. 1	\$8,240.20	Product No. 2	6,160.80	Product No. 3	10,220.90		<u>\$24,621.90</u>
Product No. 1	\$8,240.20								
Product No. 2	6,160.80								
Product No. 3	10,220.90								
	<u>\$24,621.90</u>								

Account	Reason for change or for no change being made																																
Factory Overhead	<p>The charge \$92.59, per 1st trial balance has been distributed as overhead, it does not therefore appear in the same form upon the 2nd trial balance, the summary of overhead distribution having accounted for it as follows:—</p> <table><tr><td>Factory overhead, per summary of Matl. Reqs.</td><td>\$1,291.35</td></tr><tr><td>Overhead per 1st trial balance</td><td>92.59</td></tr><tr><td>Overhead distributed, per Summary</td><td><u>\$1,383.94</u></td></tr></table>	Factory overhead, per summary of Matl. Reqs.	\$1,291.35	Overhead per 1st trial balance	92.59	Overhead distributed, per Summary	<u>\$1,383.94</u>																										
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Selling Expenses. Administrative Exp.	} Are not factory accounts																																
Cost of Sales																																	
	<p>This account—appearing upon 2nd trial balance only—is constructed from the summary of Cost of Sales, which would present the following details:—</p> <table><tr><td></td><td>Product No. 1</td><td>Product No. 2</td><td>Product No. 3</td></tr><tr><td>Mtls., per summary</td><td>\$10,120.19</td><td>\$8,120.16</td><td>\$13,140.70</td></tr><tr><td>Dept. Mtl., summary</td><td>1,220.10</td><td>750.00</td><td>3,040.20</td></tr><tr><td>Total Materials</td><td>\$11,340.29</td><td>\$8,870.16</td><td>\$16,180.90</td></tr><tr><td>Direct Labor (Pay Roll)</td><td>8,240.20</td><td>6,160.80</td><td>10,220.90</td></tr><tr><td>Prime Cost</td><td>\$19,580.49</td><td>\$15,030.96</td><td>\$26,401.80</td></tr><tr><td>Overhead per summary</td><td>480.90</td><td>503.04</td><td>400.00</td></tr><tr><td>Total Cost</td><td><u>\$20,061.39</u></td><td><u>\$15,534.00</u></td><td><u>\$26,801.80</u></td></tr></table>		Product No. 1	Product No. 2	Product No. 3	Mtls., per summary	\$10,120.19	\$8,120.16	\$13,140.70	Dept. Mtl., summary	1,220.10	750.00	3,040.20	Total Materials	\$11,340.29	\$8,870.16	\$16,180.90	Direct Labor (Pay Roll)	8,240.20	6,160.80	10,220.90	Prime Cost	\$19,580.49	\$15,030.96	\$26,401.80	Overhead per summary	480.90	503.04	400.00	Total Cost	<u>\$20,061.39</u>	<u>\$15,534.00</u>	<u>\$26,801.80</u>
	Product No. 1	Product No. 2	Product No. 3																														
Mtls., per summary	\$10,120.19	\$8,120.16	\$13,140.70																														
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Direct Labor (Pay Roll)	8,240.20	6,160.80	10,220.90																														
Prime Cost	\$19,580.49	\$15,030.96	\$26,401.80																														
Overhead per summary	480.90	503.04	400.00																														
Total Cost	<u>\$20,061.39</u>	<u>\$15,534.00</u>	<u>\$26,801.80</u>																														

Our illustration may be carried a step further, by showing that the posting of the summarizing records make it possible to prepare the following Balance Sheet, and Manufacturing and Profit and Loss Statement at the close of the cost period, April 30th, 1920, that is to say, the factory records and the General Accounts are now combined:

Balance Sheet, April 30th, 1920

ASSETS		LIABILITIES	
Cash	\$32,360.48	Accounts Payable	\$62,250.30
Notes Receivable	25,949.03	Notes Payable	19,210.20
Accounts Receivable	153,065.83	Capital Stock	330,000.00
Mdse. Inventories	260,307.00	Surplus	65,000.00
Machy. and Equipment	39,427.18	Undivided Profits:	34,649.02
		Apr. 1, 1920	\$11,917.61
		Net profit,	
		April	22,731.41
			<u>\$34,649.02</u>
Total Assets	<u>\$511,109.52</u>	Total Liabilities and Capital	<u>\$511,109.52</u>

Manufacturing and Profit and Loss Statement For the month of April, 1920

	Total	Product No. 1	Product No. 2	Product No. 3
Sales	\$90,218.60	\$30,500.00	\$20,500.00	\$39,218.60
Cost of Sales	<u>62,397.19</u>	<u>20,061.39</u>	<u>15,534.00</u>	<u>26,801.80</u>
Manufacturing Profit	<u>\$27,821.41</u>	<u>\$10,438.61</u>	<u>\$4,966.00</u>	<u>\$12,416.80</u>
Expenses:—				
Selling	\$3,090.00			
Administrative	<u>2,000.00</u>			
Net Profit	<u>\$22,731.41</u>			

The illustration is intimately connected with the more complex features of accounting for Factory costs, which will be introduced to the Student in connection with future lessons, we therefore wish to impress upon him the absolute necessity of thoroughly comprehending it. It will be observed that the Manufacturing Statement shows the Manufacturing profit from each product classification.

In the absence of classifications, the total manufacturing profit (\$27,821.41) only would be shown, leaving the manufacturer in ignorance as to the amount of the manufacturing profit derived from each one of the three lines of product.

The points at which control of factory costs is effected, as exemplified in the illustration, are clearly shown to be the following:

The merchandise inventories, per second trial balance, should agree with the same classifications shown upon the store room records. The summary of Pay Roll, or Analysis, was controlled by the Pay Roll charged upon the first trial balance.

The subject of Ledger Control may be further developed by the following:

Referring to the two trial balances of the previous illustration, and assuming two Ledgers to be in use—General Ledger, and Factory Ledger—the Control exercised within each Ledger would appear as follows:

First Trial Balance, in previous illustration, divided between "General Ledger" and "Factory Ledger."

General Ledger Accounts		Dr.		Cr.		Factory Ledger Accounts		Dr.		Cr.	
Cash		\$28,750.97				Merchandise Inventory, Apr. 1, Stores A		\$101,917.80			
Notes Receivable		25,949.03				" " " B		60,433.40			
Accounts Receivable		162,847.23				" " " C		68,377.90			
Machinery and Equipment		39,427.18				" "sub-store" " E		1,220.10			
Accounts Payable				\$68,422.19		" " " F		750.00			
Notes Payable				19,210.20		" " " G		3,040.20			
Capital Stock				330,000.00		Merchandise Purchases, Stores A		20,200.50			
Surplus				65,000.00		" " " B		18,800.50			
Undivided Profit, April 1st				11,917.61		" " " C		23,249.30			
Sales				90,218.60		Pay Roll		24,621.90			
Selling Expenses		3,090.00				Factory Overhead		92.59			
Administrative Expenses		2,000.00				General Ledger			\$322,704.19		
Factory Ledger		322,704.19									
		\$584,768.60		\$584,768.60				\$322,704.19		\$322,704.19	

Second Trial Balance, in previous illustration, divided between "General Ledger" and "Factory Ledger."

General Ledger Accounts		Factory Ledger Accounts	
Dr.	Cr.	Dr.	Cr.
Cash	\$32 360 48	Merchandise Inventory, Store A	\$110 856 81
Notes Receivable	25 949 03	Merchandise Inventory, Store B	70 652 94
Accounts Receivable	153 065 83	Merchandise Inventory, Store C	78 797 25
Machinery and Equipment	39 427 18	General Ledger (Control)	\$260 307 00
Accounts Payable			
Notes Payable			
Capital Stock			
Surplus			
Undivided Profits, Apr. 1, 1920			
Sales—Product No. 1			
Sales—Product No. 2			
Sales—Product No. 3			
Selling Expenses	3 090 00		
Administrative Expenses	2 000 00		
Cost of Sales, Product No. 1	20 061 39		
Cost of Sales, Product No. 2	15 534 00		
Cost of Sales, Product No. 3	26 801 80		
Factory Ledger (Control)	260 307 00		
	\$578 596 71		\$260 307 00
			\$260 307 00

From the foregoing exemplifications, the Student will observe that the two Controlling Accounts must always agree, that they are on opposite sides of the Ledgers, that the Controlling Accounts, in both Ledgers, will represent the Merchandise Inventory, at the end of each cost period, and that the Factory Ledger is self-balancing.

PROBLEMS FORMING THE ELEVENTH EXAMINATION.

The following is a Trial Balance of the accounts of the American Mfg. Company, as shown by the General Ledger, at January 1, 1920.

Account	Dr.	Cr.
Cash	\$18 100 90	
Merchandise Inventories:—		
Raw Materials and supplies:—		
Store Room No. 1	30 500 10	
Sub-store room Department A	10 920 40	
Sub-store room Department B	8 240 60	
Finished Product C	90 320 80	
Notes Receivable	10 000 00	
Accounts Receivable	22 120 00	
Machinery and Equipment	30 250 00	
Accounts Payable		\$20 452 80
Surplus		50 000 00
Capital Stock		150 000 00
	<u>\$220 452 80</u>	<u>\$220 452 80</u>

The transactions for the month of January were as follows:

Invoices for the following are assumed to have been entered in the Purchase Record (or Voucher Register) and posted therefrom to the Ledger:

Raw Materials purchased (per Invoice) for store-room No. 1	\$42,170.10
Administrative Expenses (per Invoice)	1,250.00
Indirect Expenses (per Invoice)	1,922.80
Selling Expenses (per Invoice)	370.20

The Pay-roll Analysis shows the following:

Productive Labor:	
Charge to Product A	\$10,150.80
Charge to Product B	8,140.20
Non-productive Labor	1,510.00
Salaries of Salesmen	2,500.00
Administrative Office Salaries	2,000.00

(The payroll was entered on the Ledger at time of payment, in one amount, it did not therefore show any analysis.) The cash transactions were:

Receipts from Customers	\$26,240.00
Discounts allowed to Customers	272.80
Payments for purchases	18,170.20
Discounts received from payments for purchases	200.40
Payment of Pay-roll for the month	24,301.00

(The cash receipts and payments are to be posted from the cash account, together with the discounts.)

The Sales were:

Of Product A	\$32,190.20
Of Product B	38,809.80

(The Sales have not previously been entered upon the Ledger.)

The Material Transfers were:

Materials transferred from store-room No. 1, to Sub-store, Department A	\$2,500.00
---	------------

A summary of Material requisitions showed:

Materials withdrawn from Store-room No. 1	
For Product A	\$12,240.60
For Product B	16,190.50

A Summary of Department Material used showed:

Material used from sub-store, Department A	
For Product A	\$2,720.60
For Product B	3,279.40

Materials used from sub-store, Department B	
For Product A	\$3,820.90
For Product B	4,419.70

A Summary of Indirect (Overhead) Expense Distribution showed:

Distributed to Product A	\$1,000.80
Distributed to Product B	2,432.00

A Summary Cost of Sales showed:

Cost of Sales—Product A	\$29,933.70
Cost of Sales—Product B	34,461.80

The Summary of production showed:

Of Product A:	
Materials	\$18,782.10
Labor	10,150.80
Overhead	1,000.80
Of Product B:	
Material	\$23,889.60
Labor	8,140.20
Overhead	2,432.00

It is assumed that a Factory Ledger is not used, therefore, the General Ledger is to contain all of the transactions.

As no details are given for apportioning any part of the selling and administrative expenses to Product A and B those expenses are to stand upon the Ledger unchanged.

The purpose of the problem is to test the student's ability to connect the factory accounts with the general accounts, and to this end it has been simplified as much as possible. The more complex considerations of detailed procedure, and Ledger control, will be presented in problems to be subsequently given.

From the foregoing details, the Student is required to prepare the necessary journal entries for all transactions, (except cash transactions and purchases) post the Journal entries to Ledger Accounts, show each Ledger account—whether balanced or not, bring down the balance of each unbalanced Ledger account, and submit a Trial Balance, as at January 31st, 1920.

The Journal entries may be made on a continuing form, thus:

Journal entries	Dr.	Cr.
-----------------	-----	-----

The Ledger Accounts may be on a continuing form, thus:

Cash	
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<u>Pay Roll</u>	
<hr/>	<hr/>
<hr/>	<hr/>
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J. LEE NICHOLSON INSTITUTE OF COST ACCOUNTING

STANDARD BASIC COURSE

TWELFTH LESSON

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TWELFTH LESSON

SUBJECT: LEDGER CONTROL OF FACTORY ACCOUNTS FURTHER DEVELOPED.

(Collateral reading, Chapter 20.)

Before proceeding to a consideration of Ledger Control, the Student must clearly understand the purpose served by a Controlling Account.

Briefly stated, the purpose is that of periodically collecting from the sources of original entry, the totals of transactions which have been entered in detailed form in some other division of the accounting system. Therefore, the balance shown by a Controlling Account should agree with the aggregate of the balances shown by the records to which the individual items were posted.

With the purpose served by a Controlling Account clearly understood, we will illustrate the subject of Ledger Control by resolving the details given in the problem, which formed the Eleventh Examination, on the assumption that instead of all the accounts being kept in the General Ledger, a General Ledger and self-balancing Factory Ledger are to be used.

The Trial Balance at January 1, 1920, shown by the problem, was wholly contained in the general ledger. Under the assumption that a General Ledger and Factory Ledger are to be represented, the Trial Balance would be divided as follows:

Trial Balance at January 1st, 1920

Account	General Ledger		Factory Ledger	
	Dr.	Cr.	Dr.	Cr.
Cash	\$18,100.90			
Merchandise Inventories:				
Raw Materials and Sup-				
plies Store room No. 1			\$30,500.10	
Sub-store—Dept. A			10,920.40	
Sub-store—Dept. B			8,240.60	
Finished Product C			90,320.80	
Notes Receivable	10,000.00			
Accounts Receivable	22,120.00			
Machinery & Equipment	30,250.00			
Accounts Payable		\$ 20,452.80		
Surplus		50,000.00		
Capital Stock		150,000.00		
Factory Ledger	139,981.90			
General Ledger				\$139,981.90
	\$220,452.80	220,452.80	139,981.90	139,981.90

The above stated exemplification of the two Ledgers shows that the factory accounts, contained in the original Trial Balance, now appear in the Factory Ledger. The aggregate of the balances (now transferred from the General Ledger) is represented by the Controlling Account "Factory Ledger" in the

General Ledger. Similarly, the aggregate of the balances in the Factory Ledger is represented by the Controlling Account "General Ledger" in the Factory Ledger. The respective controlling accounts agree, as to amount, and they appear upon opposite sides of the Ledgers.

Taking the conditions of the problem in the order in which they are stated, their incorporation in the two Ledgers would take the following course:—

The first condition relates to purchases. These transactions would be posted from the Purchase Record, or Voucher Register, as follows:—

General Ledger Accounts	Dr.	Cr.
Accounts Payable (Purchases)		\$45,713.10
Factory Ledger (Raw Materials)	\$42,170.10	
Administrative Expenses (Purchases)	1,250.00	
Factory Ledger (Indirect Expns.)	1,922.80	
Selling Expenses (Purchases)	370.20	

From the foregoing, it will be seen that the purchases made for the Factory Account are charged to the Factory by means of the controlling account "Factory Ledger", the purchases held in the remaining General Ledger accounts having no immediate accounting relation to Factory production.

The entries to be made in the Factory Ledger would be provided for by Journal Voucher, or by entries upon a Factory Journal (depending upon the method used). In either event the form would somewhat resemble the following:—

January 1920.	General Ledger Dr. Cr.	Factory Ledger Dr. Cr.
Store Room No. 1		\$42,170.10
Indirect (Overhead) Expenses		1,922.80
Purchases	\$44,092.90	

The items in the Factory Ledger Column would be posted individually to their respective accounts in the Factory Ledger. The totals, for the Cost period, of the items in the General Ledger columns would be posted to the "General Ledger" account in the Factory Ledger. After the postings were made, the accounts in the Factory Ledger would show:

Factory Ledger Accounts	Dr.	Cr.
Store Room No. 1	\$42,170.10	
Indirect (Overhead) Expenses	1,922.80	
General Ledger		\$44,092.90

The next condition of the problem related to the pay-roll analysis. The pay roll would be entered upon the General Ledger—from the cash account—as follows:—

General Ledger Accounts	Dr.	Cr.
Factory Ledger—Pay Roll—	\$19,801.00	
Selling Expenses—Pay Roll—	2,500.00	
Administrative Expenses—Pay Roll—	2,000.00	

and the following entries (posted from the analysis of Pay Roll) would appear upon the Factory Ledger.

Factory Ledger Accounts	Dr.	Cr.
Work in Process—Labor—Product A	\$10,150.80	
Work in Process—Labor—Product B	8,140.20	
Indirect Expenses (Overhead) Labor	1,510.00	
General Ledger—Pay Roll		\$19,801.00

The next condition of the problem relates to cash transactions. These would be dealt with as follows:—

General Ledger Accounts	Dr.	Cr.
Cash Account:		
Accounts Receivable	\$26,240.00	
Accounts Payable		\$18,170.20
(Ledger Accounts previously stated)		24,301.00
Accounts Receivable:—		
Receipts from Customers		26,240.00
Discounts allowed Customers		272.80
Accounts Payable:—		
Payments for purchases	\$18,170.20	
Discounts from purchases	200.40	
Discounts:—		
Allowed Customers	272.80	
From Purchases		200.40

The next condition of the problem relates to Sales. The entries would appear upon the General Ledger only, as follows:—

General Ledger Accounts	Dr.	Cr.
Accounts Receivable (Sales)	\$71,000.00	
Sales of Product A		\$32,190.20
Sales of Product B		38,809.80

The next condition of the problem relates to transfers of materials, which would be posted to the Factory Ledger from the summary of "Material Transfers":—

Factory Ledger Accounts	Dr.	Cr.
Store room No. 1 (Transfers)		\$2,500.00
Sub-store, Department A (Transfers)	\$2,500.00	

The next condition of the problem relates to Material Requisitions issued on Store Room No. 1. These would be posted to the Factory Ledger from the summary of Material Requisitions:—

Factory Ledger Accounts	Dr.	Cr.
Store room No. 1 (Requisitions)		\$28,431.10
Work in Process—Materials—Product A	\$12,240.60	
Work in Process—Materials—Product B	16,190.50	

The next condition of the problem relates to Department Material Used. These transactions would be posted to Factory Ledger Accounts from the Summary of Department Materials Used:—

Factory Ledger Accounts	Dr.	Cr.
Sub-store, Department A (Materials)		\$6,000.00
Work in Process—Materials—Product A	\$2,720.60	
Work in Process—Materials—Product B	3,279.40	
Sub-store, Department B (Materials)		8,240.60
Work in Process—Materials—Product A	3,820.90	
Work in Process—Materials—Product B	4,419.70	

The next condition of the problem relates to the distribution of the Indirect (Overhead) expenses, which would be posted to the Factory Ledger from the summary of distribution:

Factory Ledger Accounts	Dr.	Cr.
Indirect (Overhead expenses (Distributed)		\$3,432.80
Work in Process—Overhead—Product A	\$1,000.80	
Work in Process—Overhead—Product B	2,432.00	

The next condition of the problem relates to production, which would be posted from the summary to the Factory Ledger:

Factory Ledger Accounts	Dr.	Cr.
Product A	\$29,933.70	
Product B	34,461.80	
Work in Process—Material—Product A		\$18,782.10
Work in Process—Labor—Product A		10,150.80
Work in Process—Overhead—Product A		1,000.80
Work in Process—Materials—Product B		23,889.60
Work in Process—Labor—Product B		8,140.20
Work in Process—Overhead—Product B		2,432.00

The next condition of the problem relates to the cost of Sales, which would be posted to the two Ledgers from the summary:

General Ledger Accounts	Dr.	Cr.
Cost of Sales—Product A	\$29,933.70	
Cost of Sales—Product B	34,461.80	
Factory Ledger (Cost of Sales)		\$64,395.50

Factory Ledger Accounts	Dr.	Cr.
General Ledger (Cost of Sales)	\$64,395.50	
Product A (Cost of Sales)		\$29,933.70
Product B (Cost of Sales)		34,461.80

As a means of further elucidation, the student is requested to summarize the accounts represented by the foregoing entries (both as to accounts and Ledgers) connect the resulting balances with the Trial Balance, as at January 1, 1920, produce the ending Trial Balance, as at January 31, 1920, and forward the solution to us.

QUESTIONS FORMING THE TWELFTH EXAMINATION.

1. What is meant by a self balancing Factory Ledger?
2. If a Factory Ledger is not self balancing, is it possible to control it in the General Ledger, and how?

3. As between a Factory Ledger, which is not self balancing, and one which is self balancing, in what respect would Trial Balances differ?
4. Name and explain an advantage in keeping Work in Process accounts classified as to product, and as to elements of cost which they represent.
5. Referring to Ledger Accounts of Work in Process at the end of a cost period, what factory records control them?
6. Assuming the production of a factory to have been \$35,000.00 for staple product, and \$5,000.00 for a machine for the factory use, should the Summary of regular factory production show \$35,000.00 or \$40,000.00, and why?

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STANDARD BASIC COURSE

THIRTEENTH LESSON

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THIRTEENTH LESSON

SUBJECT: GENERAL FINANCIAL STATEMENTS, AND STATEMENTS OF FACTORY COSTS.

(Collateral reading, chapter 21.)

The value of any financial or statistical statement is wholly dependent upon the manner in which the details presented are arranged. If properly arranged, the information which the statement is intended to convey will be immediately apparent.

If improperly arranged, an analysis (or virtual rearrangement) must be made before required information is obtained. Care in the preparation of statements is an absolute necessity which we wish to emphasize, and fully impress upon the Student.

It is equally important that statements are presented at the proper time, that is, within a reasonable time after the transactions occurred. Promptly rendered statements enable an executive to take prompt measures in business policy and management, whilst lack of promptness in rendering statements deprives an executive from the advantage which would have accrued from prompt application of remedial measures.

The advantage of a properly arranged financial statement is illustrated by the following Balance Sheets, both of which present identical details, the difference being in their arrangement only.

BALANCE SHEET, JANUARY 31, 1920

(Not arranged in an orderly manner)

ASSETS:

Cash on hand	\$ 320.00
National City Bank	12,570.10
Furniture and Fixtures—Office	750.00
Land (Factory Site)	30,000.00
Merchandise Inventory	25,000.00
Accounts Receivable	52,814.90
Buildings	65,000.00
Machinery and Equipment	90,500.00
Notes Receivable	3,000.00
Total Assets	<u>\$279,955.00</u>

LIABILITIES:

Accounts Payable	\$ 8,500.00
Capital Stock	200,000.00
Surplus	50,000.00
Notes Payable	5,000.00
Undivided Profits	16,455.00
Total Liabilities and Capital	<u>\$279,955.00</u>

BALANCE SHEET, JANUARY 31, 1920

(Arranged in an orderly manner)

ASSETS:

Current Assets:		\$ 93,705.00
Cash:		
National City Bank	\$12,570.10	
On hand	320.00	
		<u>\$ 12,890.10</u>
Accounts Receivable		52,814.90
Notes Receivable		3,000.00
Merchandise Inventory		25,000.00
		<u>\$ 93,705.00</u>
Plant Assets:		185,500.00
Land	\$ 30,000.00	
Buildings	65,000.00	
Machinery and Equipment	90,500.00	
	<u>\$185,500.00</u>	
Furniture and Fixtures—Office		750.00
Total Assets		<u>\$279,955.00</u>

LIABILITIES:

Current Liabilities		\$ 13,500.00
Accounts Payable	\$ 8,500.00	
Notes Payable	5,000.00	
	<u>\$13,500.00</u>	
Capital Stock		\$200,000.00
Surplus and Undivided Profits		66,455.00
Surplus	\$50,000.00	
Undivided Profits	16,455.00	
	<u>\$66,455.00</u>	
Total Liabilities and Capital		<u>\$279,955.00</u>

The difference in the arrangement of the two Balance Sheets is immediately apparent. The arranged statement shows the details, and amounts, of the total Current Assets and Current Liabilities, the difference in this case, being the amount of Working Capital, thus:

Current Assets	\$93,705.00
Current Liabilities	<u>13,500.00</u>
Working Capital	<u>\$80,205.00</u>

The Statement also shows the details, and totals, of Plant Assets, and of Surplus and Undivided Profits.

The unarranged statement, whilst presenting the same balances, fails to give any information other than the amount of each balance.

Financial Statements for manufacturing businesses will usually comprise a Balance Sheet (exemplified above), a manufacturing Statement, and a Profit and Loss Statement, with such supporting Schedules as may be necessary. Any further statements relating to the manufacturing accounts would be designated as Statistical Statements.

A Manufacturing Statement deals with the financial transactions of the factory, showing (with as much detail as may be required) the manufacturing Costs.

A Profit and Loss Statement deals with financial transactions (with as much detail as may be required) of the business in its entirety.

The following illustrates a combination of the two statements, which would be designated as a Manufacturing and Profit and Loss Statement.

Manufacturing and Profit and Loss Statement, for January 1920.

Sales		\$55,117.00	
Cost of Sales:			
Mdse. Inventory Jan. 1, 1920.	\$21,619.40		
Merchandise Purchases	<u>15,122.30</u>		
	\$36,741.70		
Deduct			
Mdse. Inventory Jan. 31, 1920.	<u>\$25,000.00</u>		
Cost of Materials	11,741.70		
Direct Labor	18,529.60		
Factory Indirect Expenses	<u>2,666.00</u>		
Cost of Sales	\$32,937.30		
Gross (Manufacturing) profit	\$22,179.70		
Expenses:			
Selling Expense	\$3,640.80		6.61
Salesmen's Salaries	\$1,500.00		
Commissions-Salesmen	<u>2,140.80</u>		
	\$3,640.80		
Administrative Expense	\$2,084.14		3.78
Stationery & Printing	\$ 57.10		
Telegrams & Telephone	27.04		
Office Salaries	<u>2,000.00</u>		
	\$2,084.14		
Total Expenses	\$5,724.94		
Net profit	<u>\$16,454.76</u>		
			29.85
			<u>100.00</u>

Managers and Executives are accustomed to the use of percentages. They form estimates and compare results by means of percentages. The percentages which the various Costs bear to the Sales—shown in the illustration—are more illuminating to the Manager, or executive, than are the figures representing the percentages.

It is rarely the case that a statement is sufficiently explicit by exhibiting balances only. For instance, the balances shown by the illustration should be supported by Schedules giving details of Accounts Receivable, Notes Receivable (particularly with respect to collectibility) Merchandise Inventory, Classification Changes that have occurred in the Plant Assets during the period, Accounts Payable, Notes Payable, Sales Classifications, and Factory Indirect expenses, the object being to show all details which materially affect each important item that is shown upon the statement in the form of a total.

The financial statements illustrated are such as would be required by an executive.

Statistical Statements, and reports are required for the guidance of department managers. As an instance, the manager of a Sales department employing a number of salesmen should be informed, at the close of each cost period, of the results accomplished by each salesman. If we assume four salesmen to be employed, the following statement would be interesting to the manager of the Sales department. If in addition, a statement were prepared to show the unexecuted orders, the activities of each salesman would be under close scrutiny.

COSTS OF EMPLOYING SALESMEN

	Salesman No. 1			Salesman No. 2			Salesman No. 3			Salesman No. 4		
Total Sales		% 58.57	5,600.00		% 55.24	7,240.60		% 60.00	3,500.00		% 78.67	1,500.00
Mfg. Cost of Sales			3,280.00			4,000.00			2,100.00			1,180.00
Gross Profit			2,320.00			3,240.60			1,400.00			320.00
Selling Cost												
Salary	250.00			250.00			200.00			200.00		
Traveling Expenses	185.00			220.00			185.00			210.00		
Total		7.77	435.00		6.49	470.00		11.00	385.00		27.33	410.00
Net Profit		33.66	1,885.00		38.27	2,770.60		29.00	1,015.00	Loss	6.00	90.00
		100.00			100.00			100.00			100.00	

The percentages shown on the statement are of the Sales. A statement arranged in the manner shown, would inform the Sales Manager of the selling results from each Salesman. His knowledge of the possibilities attaching to territorial assignments, and lines represented, enables him to compare actual results with anticipations. The Statement puts him in a position to effectively criticize each Salesman.

In order that a Sales Manager may be able to efficiently direct the selling force, he must be regularly advised of the production of the Factory, the cost of production, and the condition of the inventories of all finished product. It may be advisable to instruct the selling force to concentrate upon particular lines, or to accept orders only for future delivery, or to revise selling prices—etc., etc. These policies would be largely influenced by a periodical statement, somewhat as follows:

Assuming the output of a factory to consist of three products, and the given details to represent the output for a cost period, the Inventory changes during the period would be of value to a Sales Manager.

DETAILS OF INVENTORY, RELATING TO FINISHED PRODUCT

	Product No. 1	Product No. 2	Product No. 3
Inventory at beginning of Cost Period	\$ 8,916.20	\$14,210.30	\$ 3,147.10
Production during Cost Period	9,417.70	18,660.10	22,719.80
Total	\$18,333.90	\$32,870.40	\$25,866.90
Cost of Sales during Cost Period	\$16,120.60	\$ 4,280.64	\$23,177.40
Inventory at End of Cost Period	\$ 2,213.30	\$28,589.76	\$ 2,689.50

This statement advises the Sales Manager as to the Sales and present inventories of each of the products, from which he will be able to intelligently regulate production, particularly if the products are standard with the factory.

A statement should also be presented to the Sales Manager showing the various classifications of Raw Materials in the inventory, for which there appears to be little demand. He may be able to promote the Sale of a finished product which will absorb the raw materials in question.

Periodical statements should be furnished to the Purchasing Department showing the condition of the inventory with respect to raw materials for which maximum and minimum quantities have been set, by way of confirming the imposed conditions, and also for the purpose of bringing to the notice of the department any obsolete stock that may exist. If the Sales department is unable to deal with it, the purchasing department may be able to arrange for its return to the seller, or otherwise dispose of it.

Statements to General Superintendents, or Production Manager, will particularly deal with volume of production, and the costs, for comparable periods. If we assume a Factory to be divided into three departments—A—B—C—a statement of Costs and production, may be illustrated as follows: (Assumed amounts are used, except where the amounts of one statement enter into another statement.)

DETAILS OF COSTS

	Department A			Department B			Department C		
	Current Period	Previous Period	Increase Decrease	Current Period	Previous Period	Increase Decrease	Current Period	Previous Period	Increase Decrease
Materials	\$10,160.20	\$8,180.60	\$1,979.60	\$16,940.60	\$18,490.06	\$1,549.46	\$20,130.20	\$17,170.80	\$2,959.40
Productive Labor	5,270.90	4,090.70	1,180.20	8,927.60	8,170.20	757.40	15,170.80	13,230.20	1,940.60
Overhead									
Supervision	175.00	175.00		200.00	200.00		250.00	250.00	
Non-productive labor	763.50	670.50	93.00	1,020.80	1,516.10	495.30	1,575.20	1,425.80	149.40
Repairs	97.40	56.70	40.70	126.20	139.12	12.92	156.80	92.10	64.70
Depreciation	57.10	57.10		82.90	82.90		97.15	97.15	
Taxes	32.60	32.60		98.40	98.40		112.12	112.12	
Rent	100.00	100.00		125.00	125.00		150.00	150.00	
Supplies	24.22	18.60	5.62	18.76	24.80	6.04	36.20	30.00	6.20
Light—Heat—Power	52.10	46.10	6.00	81.90	96.90	15.00	95.60	90.20	5.40
Sundry Expenses	12.14	10.14	2.00	13.12	15.70	2.58	18.20	16.10	2.10
Defective Work		70.60	70.60	124.00		124.00	82.60	110.60	28.00
Total Costs	\$16,745.16	\$13,508.64	\$3,236.52	\$27,759.28	\$28,959.18	\$1,199.90	\$37,874.87	\$32,775.07	\$5,099.80

Summary of Costs, Arriving at Production.

	Department A			Department B			Department C		
	Material	Labor	Overhead	Material	Labor	Overhead	Material	Labor	Overhead
Work in process at beginning of period	\$ 4120.40	\$3000.60	\$ 792.20	\$ 9160.10	\$ 4500.00	\$1126.40	\$11260.00	\$ 5140.00	\$1460.30
Total costs, per Statement	<u>10160.20</u>	<u>5270.90</u>	<u>1314.06</u>	<u>16940.60</u>	<u>8927.60</u>	<u>1891.08</u>	<u>20130.20</u>	<u>15170.80</u>	<u>2573.87</u>
Totals	\$14280.60	\$8271.50	\$2106.26	\$26100.70	\$13427.60	\$3017.48	\$31390.20	\$20310.80	\$4034.17
Work in process at end of period	<u>5120.40</u>	<u>3980.20</u>	<u>840.20</u>	<u>9920.20</u>	<u>4750.00</u>	<u>1370.18</u>	<u>9270.00</u>	<u>4160.00</u>	<u>1240.20</u>
Balance, production during the period	<u>\$9160.20</u>	<u>\$4291.30</u>	<u>\$1266.06</u>	<u>\$16180.50</u>	<u>\$8677.60</u>	<u>\$1647.30</u>	<u>\$22120.20</u>	<u>\$16150.80</u>	<u>\$2793.97</u>

The statement, "Summary of Costs," now shows the details of costs, and of production, divided into the elements of cost. A comparative statement of production may now be shown by means of the following form:

COMPARATIVE STATEMENT OF PRODUCTION

Product and Department	Current Period	Previous Period	Increase Decrease
Product A, Dept. A (Increase say 100 units)	\$14,717.56	\$12,128.10	\$ 2,589.46
Product B, Dept. B (Increase say 150 units)	26,505.40	18,960.20	7,545.20
Product C, Dept. C (Decrease say 300 units)	41,064.97	61,270.10	20,205.13
Totals	<u>\$82,287.93</u>	<u>\$92,358.40</u>	<u>\$10,070.47</u>

The statement now shows that Department A and B have increased their production, as compared with the previous period, and that Department C turned out a decreased production.

The management might be disappointed with the increased production in Department A and B, and would probably carefully investigate Department C.

A further schedule should be prepared, showing the units of similar product turned out during the comparative periods. A comparison of costs only would not provide a basis from which efficiency could be gauged, since the material, labor, and overhead costs may have varied, for identical products. If, however, the statements shown above are supported by a schedule of unit production, the management would be able to thoroughly dissect the activities of each department.

The figures in the illustrations are assumed throughout, except at the points of their connection one with the other, the connecting figures being susceptible to proof.

Extreme care should be taken to ensure accuracy in all statements submitted. Where the figures in one statement are also included in a connecting statement, proof of agreement should be made.

In order that statements may be submitted promptly, all details must be kept closely entered and posted.

PROBLEM FORMING THE THIRTEENTH EXAMINATION.

The following problem is designed to test the student's ability to properly account for a number of classifications.

Problem:

The following details for a cost period are shown by summarizing Records:

Summary of Material Requisitions:

Raw Materials, from store room No. 1 for Department A	\$18,167.14
Raw Materials, from store room No. 1 for Department B	22,832.86
Raw Materials, from store room No. 2 for Department C	15,216.40

Summary of Material used by Departments:

Dept. A for Product No. 1, \$8370.60—Product No. 2, \$ 4180.10	\$12,550.70
Dept. B for Product No. 3, \$7160.20—Product No. 4, \$11316.14	18,476.34
Dept. C for Product No. 5, \$3170.60—Product No. 6, \$ 6000.90	9,171.50

Summary of Pay Roll Analysis:

Productive Labor,	
Dept. A. Product No. 1, \$5120.10—Product No. 2, \$4960.20	\$10,080.30
Dept. B. Product No. 3, \$7719.15—Product No. 4, \$8122.22	15,841.37
Dept. C. Product No. 5, \$2930.40—Product No. 6, \$5420.15	8,350.55
Non-productive labor, Department A	1,024.37
Non-productive labor, Department B	850.00
Non-productive labor, Department C	400.00

The Factory Overhead reported by the General Office was as follows:

(An account for each item is to be shown upon the Factory Ledger.)

Indirect Material	\$217.80
Indirect Labor	894.80
Rent (\$350.00) Insurance (\$150.00)	500.00
Taxes (\$180.00) Depreciation (\$275.00)	455.00
Light, Heat and Power	320.40
Repairs (\$126.50) Supplies (\$218.90)	345.40
Sundry Expenses	114.10
Total	\$2,847.50

Summary of Factory Overhead Distribution, to Departments.

Description	Total	Dept. A	Dept. B	Dept. C
Indirect Material	\$217.80	\$92.60	\$57.40	\$67.80
Indirect Labor	894.80	390.40	287.60	216.80
Rent	350.00	125.00	125.00	100.00
Insurance	150.00	60.00	50.00	40.00
Taxes	180.00	65.00	62.50	52.50
Depreciation	275.00	115.00	60.00	100.00
Light, Heat and Power	320.40	155.00	100.00	65.40
Repairs	126.50		80.00	46.50
Supplies	218.90	60.90	100.10	57.90
Sundry Expenses	114.10	44.10	40.00	30.00
	<u>\$2,847.50</u>	<u>\$1,108.00</u>	<u>\$962.60</u>	<u>\$776.90</u>

Summary of Overhead Distributed to Products

	Dept. Total	Department A Product		Department B Product		Department C Product	
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Department A	\$2132.37	\$1108.00	\$1024.37				
Department B	1812.60			\$962.60	\$850.00		
Department C	1176.90					\$776.90	\$400.00
	<u>\$5121.87</u>	<u>\$1108.00</u>	<u>\$1024.37</u>	<u>\$962.60</u>	<u>\$850.00</u>	<u>\$776.90</u>	<u>\$400.00</u>

Summary of Production Reports

Classifications of Finished Stock	Total Cost of each Product	Department A		Department B		Department C	
		Material	Productive Labor	Material	Productive Labor	Material	Productive Labor
Product No. 1.	\$14,598.70	\$8,370.60	\$5,120.10				
Product No. 2.	10,164.67	4,180.10	4,960.20				
Product No. 3.	15,841.95			\$7,160.20	\$7,719.15	\$962.60	
Product No. 4.	20,288.36			11,316.14	8,122.22	850.00	
Product No. 5.	6,877.90					\$3,170.60	\$2,930.40
Product No. 6.	11,821.05					6,000.90	5,420.15
							400.00
						\$9,171.50	\$8,350.55
							\$1,176.90

From the foregoing details, the Student is required to prepare Journal entries for recording the transactions upon the Factory Ledger, and exhibit Factory Ledger Accounts for each classification of Work in process (divided into Material, Labor and Overhead), each raw material stock account, and each finished product stock account. He is also to present a trial balance of the completed accounts.

The various classifications to be dealt with are indicated in the details, by letters and numbers.

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J. LEE NICHOLSON INSTITUTE OF COST ACCOUNTING

STANDARD BASIC COURSE

FOURTEENTH LESSON

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FOURTEENTH LESSON

SUBJECT: GENERAL REVIEW OF IMPORTANT MATTERS IN THE
PROCEDURE OF HANDLING COST RECORDS.

The student is now familiar with the various forms of factory reports, their purposes, and their inter-relation with the financial records.

The variety of the reports, the differing sources from which they originate, and the accounting purposes which they serve, at once suggest the importance of having a well planned, and properly conducted system for utilizing them.

A well planned, and properly conducted system will involve the following prime requisites:—

- (a) Designing the forms in such manner as that the particular conditions of a business may be fully provided for. The student may take it for granted that—in a general sense—no one design will be identically applicable to any two businesses, even though the two businesses are identical in character. If the student thoroughly understands the service rendered by a report, he will not encounter any difficulty in providing the requisite form.
- (b) When the forms are put in use, thereby becoming reports, to be used for accounting purposes, it will be necessary to see that each report (of each kind) is accounted for. This may be accomplished by a numerical order of control as to single reports, and serial number control as to kind of report.
- (c) The system should provide for designated personal responsibility as to authority, and correctness of entries and computations, that is, indiscriminate certifications, initialling or signature, should not be permitted.
- (d) The system must provide an efficient means for issuing, and delivering the reports to the points for which they are intended, and for collecting them when they are available for office use.
- (e) The system must provide an efficient means for examining reports, to see that each requisite has been properly complied with, before they are incorporated in the accounts.
- (f) The system must provide an efficient means for incorporating the reports in the accounts. This requirement involves the employment of methods by which aggregations (or totals) of similar items entering into the same account (or classification) may be posted to the accounts, instead of posting the items individually. For instance, postings from the totals of the summarizing records (referred to in previous lessons) will save the clerical effort which would be required if the summarizing records were entered upon the journal, as the original accounting entry. Similarly, if all similar items for which a special column could not be provided upon the Purchase Record or Voucher Register were entered in the miscellaneous columns, the individual postings required would be enormous, whereas the aggregating similar items upon an analysis record, they may be posted in

total. This procedure, however, requires that all records—other than regular books of account—from which aggregations are posted to the Ledger, must be clearly indicated in the Ledger entry both by description, and number, so that reference may be as immediately available as would be the case if the entries were posted from a book of account.

- (g) The system must provide a method for regularly entering the reports, to the end that this part of the work may be kept up as closely as possible, thus enabling the prompt preparation of statements at the close of each cost period.
- (h) The system must provide for making proofs at all provable points, such as, proving the purchases and material requisitions with the store room records when the latter show cost values, proving the labor reports with the pay roll, etc.; so that differences may be corrected before Ledger entries are made.
- (i) The system must provide a thoroughly adequate method for filing the reports so that they may be immediately located, for reference purposes.

QUESTIONS FORMING THE FOURTEENTH EXAMINATION.

1. What is meant by the term "Perpetual Inventory?"
2. Describe the procedure, in an accounting system, required to produce a perpetual inventory.
3. Describe the conditions which determine a Cost as being indirect, or overhead.
4. An Invoice for merchandise purchases shows the following:—

Imported Raw Materials	\$2,500.00	
Trade Discount	<u>150.00</u>	\$2,350.00
Duty and custom charges		780.00
Freight		120.00
Cartage to store room		35.00

Which of the costs, shown by the Invoice, would you include as Cost of the raw materials?

5. Is the expense of packing finished product a factory cost invariably? Explain your answer.
6. Describe the manufacturing conditions which must exist in a factory, if the special order and process methods of cost finding are to be jointly employed.
7. If several standard products are manufactured in a factory, what principle would you employ for showing the manufacturing cost of each product?
8. Referring to the usual routine of factory work, and the requirements of a cost system, what principal written orders, and reports, would generally be required for conducting the system from the point of providing materials to the point of ascertaining costs?
9. Assuming orders No. 1,000 and No. 1,050 to be in process of manufacture and that scrap material from order No. 1000, to the value of \$100.00, was used on order No. 1,050. How would you account for the scrap material?

10. Referring to question No. 9, if the scrap material used for order No. 1,050 could not be identified with the original material from which it was obtained, how would you account for it?
11. What should a rate for depreciation represent?
12. In writing depreciating against wasting assets, would you apply the depreciation as a credit to the asset account, or would you hold it in a reserve account? Give reasons.
13. Show by a formula, the following method of distributing overhead:
 - (a) Prime Cost method
 - (b) Productive Labor, Cost method
 - (c) Productive Labor Hours method
14. What are the sources from which Factory overhead is generally compiled?
15. What purposes are served by Production Reports?
16. What principal financial and statistical statements would ordinarily be of prime interest to Executives and managers at the end of each cost period?

The Student will please note that the Fifteenth Lesson will be devoted to a preliminary examination of subjects previously presented, and covered by collateral reading to and including chapter No. 21. Before answering the questions and problems, which form the examination, a careful review of the collateral reading should be made.

10. Referring to question No. 9, if the setup had been used for order No. 7,500, would not be identical with the original machine in use, which it was obtained, how would you account for it?

11. What should be noted for identification purposes?

12. Is setting depreciation against a fixed asset account, as shown in the account, correct? If not, what is the correct entry?

13. Show by a formula the following method of depreciation:

- (a) Straight line method
- (b) Sinking fund method
- (c) Production or usage method

14. What are the advantages and disadvantages of each of the above methods?

15. What purposes are served by depreciation?

16. What is the principal difference between depreciation and depletion?

The student will find that depreciation is a method of allocating the cost of a tangible asset over its useful life, while depletion is a method of allocating the cost of a natural resource over its useful life. Depreciation is used for assets that are used up over time, while depletion is used for assets that are used up by extraction or mining.

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FIFTEENTH LESSON

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FIFTEENTH LESSON

FIFTEENTH EXAMINATION.

The answers to the following problems are to be connected with the problems by the number of the problem, and the letter given to each division of the problem. Thus—Problem No. 1, (a), (b), etc., etc.

Continuing blank forms may be used for Journal entries, and Ledger Accounts, but each Journal entry or Ledger Account must be distinctly shown, thus:

Journal Entries	Dr.	Cr.
General Ledger	
To Cost of Sales	

Factory Ledger Accounts	Dr.	Cr.
Cost of Sales

General Ledger

Problem No. 1.

Factory order No. 2000 was issued for the manufacture of 20 special articles, of similar kind, by department A.

Charges against the order were as follows:

Material Requisitions were issued on Store-room No. 1 for raw materials amounting to \$2,500.00.

Reports of Materials used, showed the Materials used amounted to \$2912.00.

Details of Labor Charges, expended upon the order were reported as:

Productive Labor	\$3,060.00
Non-Productive Labor	390.00
	<u>\$3,450.00</u>

The Total Labor Hours expended upon the Order were 6880, the Cost being \$3,450.00, as stated above.

The General Factory Overhead amounted to \$619.20, and the Productive Labor Hours of the factory were 20640.

It is to be assumed that no entries have been made accounting for the foregoing details.

You are required to prepare (a) a statement showing the cost of the Order for Materials, Labor, Overhead, and Total Cost.

The Factory Overhead is to be distributed on the basis of Productive Labor Hours, the formula for distribution being shown.

(b) If an adjustment of the Material Account of Department A is necessary, it is to be made by Journal entry.

(c) Point out, and explain, an error which exists in the foregoing conditions of the problem.

Problem No. 2.

The following is a Trial Balance of a Factory Ledger at the commencement of a Cost Period:

				Dr.	Cr.
Raw Materials				\$150,000.00	
Work in Process	Material	Labor	Overhead		
Product 1, Dept. A.	\$10,058.73	\$12,941.27	\$ 716.40	23,716.40	
Product 2, Dept. A.	6,213.43	5,453.24	610.60	12,277.27	
Product 3, Dept. B.	16,706.90	20,959.77	1,756.70	39,423.37	
	<u>\$32,979.06</u>	<u>\$39,354.28</u>	<u>\$3,083.70</u>		
					\$225,417.04
General Ledger				<u>\$225,417.04</u>	<u>\$225,417.04</u>

The following production is reported during the cost period:

Department and Product	Material	Productive Labor	Overhead
Dept. A, Product No. 1	\$30,176.20	\$38,823.80	} \$3,678.90
Dept. A, Product No. 2	18,640.30	16,359.70	
Dept. B, Product No. 3	50,120.70	62,879.30	
Defective Work	520.80	640.20	5,270.10
Defective Work of Dept. B was corrected by Dept. A. The cost is to be applied as Overhead in distributing Department Overhead.			
	<u>\$99,458.00</u>	<u>\$118,703.00</u>	<u>\$8,949.00</u>

The Department Overhead is to be distributed to the Product on the basis of Productive Labor Hours.

The Productive Labor Hours of Department A were 122630, accounted for as follows:

84583 hours employed on Product No. 1.

36355 hours employed on Product No. 2.

1422 hours employed on defective work of Department B.
122360

From the foregoing particulars, prepare:

Factory Journal entries, Factory Ledger Accounts, and a Trial Balance of the Factory Ledger at the close of the Cost Period.

Problem No. 3.

From the following Trial Balance, prepare a Balance Sheet, and a Manufacturing and Profit and Loss (combined) Statement:

Trial Balance, May 31st, 1920.

Account	Dr.	Cr.
Cash at Bank	\$ 80,120.60	
Cash on Hand	1,410.20	
Accounts Receivable	120,190.10	
Notes Receivable	3,500.00	
Merchandise Inventory	112,260.20	
Accounts Payable		\$ 36,500.20
Sales		240,960.00
Cost of Sales	124,191.40	
Salesmen's Salaries	18,120.60	
Salesmen's Commissions	15,210.20	
Printing & Stationery (Sales Dept.)	820.40	
Office Salaries (Administrative Dept.)	6,290.00	
Printing & Stationery (Administrative Dept.)	360.10	
Telephone & Telegrams (Administrative Dept.)	190.20	
Machinery & Equipment	100,000.00	
Capital Stock		250,000.00
Surplus		55,203.80
	<u>\$582,664.00</u>	<u>\$582,664.00</u>

The Merchandise Inventory at May 1, 1920, was \$96,120.40.

Merchandise Purchases during May, were \$55,000.60.

The Cost of Sales comprised:

Materials \$38,860.80, Labor \$80,120.40, Indirect Expenses \$5,210.20—Total \$124,191.40.

You are also requested to prepare a separate schedule showing the percentages of Cost to Sales, which you think would be appreciated by the management.

From the following Trial Balance prepare a Profit and Loss Statement for the year ended 31st March 1950.

Trial Balance - 31st March 1950

Particulars	Debit	Credit
Capital		10,000
Reserve		2,000
Bank	1,000	
Debtors	500	
Creditors		1,500
Stock	2,000	
Plant & Machinery	3,000	
Prepaid Insurance	100	
Salaries & Wages	1,500	
Printing & Stationery	200	
Office Expenses	100	
Interest on Loan	100	
Depreciation	100	
Profit		1,000

Total 15,000

Total 15,000

Total 15,000

Total 15,000

Total 15,000

Total 15,000

Total 15,000

Total 15,000

Total 15,000

Total 15,000

Total 15,000

J. LEE NICHOLSON INSTITUTE OF COST ACCOUNTING

STANDARD BASIC COURSE

SIXTEENTH LESSON

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SIXTEENTH LESSON

SUBJECTS: TAKING PHYSICAL INVENTORIES THE PURPOSES
OF PLANT ASSET RECORDS.

(Collateral reading, chapters 22 and 23.)

Physical Inventories are usually taken once a year. Under the most favorable conditions, the taking of such an inventory involves a considerable expenditure of time and clerical work.

In a large business, the constantly changing condition of a merchandise inventory—from moment to moment—imposes a high degree of skill and care both as to accuracy, and interfering as little as possible with current work if the inventory is taken whilst the plant is in operation.

Ordinarily, the inventory is a matter of such prime importance as to warrant the stoppage of the plant, whilst it is being taken.

In this connection, the student will more fully appreciate the importance of what has been said in previous lessons respecting inventory tests.

If tests have been made throughout a year covering the greater part of the inventory, and discrepancies traced and adjusted, the reconciliations of the store room records with the physical inventory will be very materially simplified.

The arrangements for taking a physical inventory require very careful planning, particularly with respect to the following:

- (a) Superintendents, Department Managers, Foremen, Stock Clerks, Factory Clerks, and other employees who may be concerned should be notified in advance of the intention to take an inventory as at the close of business upon a designated date.
- (b) The responsibility for accurate results, and properly conducted details, should be placed upon an employee in each department, whose duties logically qualify him as the person who should supervise the work.
- (c) As much preliminary work should be done as possible, in order that the inventory may be taken with the least possible delay. This applies particularly to arranging the stocks in classified order, to facilitate counting, weighing, or measuring, and designating stocks which are obsolete. The management will probably employ means for disposing of the latter.
- (d) Preparatory work, of great assistance, may be done by preparing schedules outlining the contents of store-rooms, taking as a basis the various classifications shown upon the store-room records in the order of their location in the store-room, requiring the filling in of the details only. This preparation will also serve to ensure that nothing is overlooked.
- (e) Responsible arrangements must be made for pricing the inventory. The best accounting practice requires that an inventory shall be valued at cost, or market value, whichever is lower, provided the

market value is not flagrantly influenced by artificial conditions, which it is known would not hold if the quantity in the inventory were purchased in the market. If the value of an inventory is to be reduced on account of the market value being lower than the cost value, both the values should appear upon the Inventory. In the majority of such cases the difference may be expressed by a percentage which will probably be applicable to entire classifications. The total reduction for each classification shown upon the recapitulation sheets would then provide the means by which the inventories shown by the accounts (perpetual inventories) could be brought into agreement with the revised valuations shown by the Physical Inventory. If the reductions were not clearly accounted for, they would assume an arbitrary aspect not susceptible to an adequate explanation.

- (f) All computations upon the sheets should be checked, and each sheet should bear a stamped impress describing each operation of the work, each such operation being initialled by the employee who performed it.
- (g) When the accounting system provides a control of the classifications into which an inventory is divided, comparisons between the book and physical inventories should be made as soon as possible in order that abnormal differences may be traced with the least of difficulty imposed by current changes. In this connection the value of a controlling account is very clearly illustrated.

Plant Asset Records:

It is not unusual to find defective accounting methods for the fixed assets of a Plant. The defect generally consists in representing the assets in one account upon the General Ledger, the account embracing Land, Buildings, Machinery and General Equipment. The fact that Land is generally subject to an appreciation in value, and that Buildings, Machinery and General Equipment are generally subject to varying rates of depreciation, suggest the necessity of separate classifications upon the Ledger. Even though separate classifications are shown upon the Ledger, further details are required showing the units—and their values—which enter into each classification. The inadequacy of a Ledger Account, even when classified, to provide requisite information as the book value of any particular unit may be illustrated by the following details, assumed to be applicable to an Iron Working plant. The General Ledger Account (often the case) shows in one amount, a purchase of six Lathes, three of which are identical, costing \$3000.00 each, and three, also identical, costing \$1500.00 each, the total cost of the six Lathes (\$13,500.00) being held upon the Ledger as follows:

Machinery and Equipment	Dr.	Cr.
1910		
Jan. 2. Johnstone and Curry, 6 Lathes	\$13,500.00	

Now, assume the following to have occurred:

- (a) At December 31, 1919, one of the large Lathes is sold (retired from service) for \$1000.00
- (b) Depreciation has been credited to a Reserve Account, at the rate of $7\frac{1}{2}$ per cent per annum, on the original value, each year for the 10 years, from January 1, 1910 to December 31, 1919.

(c) The realized depreciation would be:

Estimated depreciation provided for	\$1012.50
Actual depreciation (Cost \$3000.00 less residual value \$1000.00)	\$2000.00
Less reserve, as above	\$1012.50 987.50
Realized Depreciation	<u>\$2000.00</u>

In order that the Ledger Account may be properly adjusted, an analysis of the charge of \$13,500.00 would be required to ascertain the original cost of the Lathe which was retired from service.

An analysis of the account "Reserve for Depreciation" would also be required for the purpose of ascertaining the precise amount which was written against the book value of the particular Lathe in question. In all probability, it would be necessary to refer to the purchase invoice to establish the original cost value, and, as a lapse of 10 years has occurred, it may be a difficult—even if possible matter to locate it.

The purpose of a Plant Asset Record is to provide a complete history of each unit of the plant, in appropriately classified order.

The record would show the date when purchased, from whom purchased, the purchase price, any guarantee as a condition of the purchase, the cost of installation, the location of the unit in the plant, its description, and the amount periodically provided for depreciation.

The record would be controlled by the General Ledger, as to original cost by suitably classified accounts, and, as to depreciation by suitably classified Reserve Accounts.

Applying the purpose of the Record to the foregoing illustration, its utility is obvious.

The book value of the Lathe, retired, from service, would be instantly ascertainable.

Briefly stated, the general ledger accounts would show in total the aggregate unit values shown upon the record for each classification.

In cases where a Plant Asset Record is applicable, but not in use, the installation of the Record is sufficiently important to warrant an appraisal of Plant Units, if their value cannot be satisfactorily established from the books of account.

QUESTIONS FORMING THE SIXTEENTH EXAMINATION.

1. If a shortage of material on hand is shown by an inventory, would the shortage be a justifiable charge as an item of overhead? Give reasons for your answer.
2. Assuming a shortage of \$1000.00 to be shown by an inventory of raw materials, classified in the accounts (Factory Ledger, and Store Room Records) as R. M. No. 1, and the cause of the shortage was undetermined, what adjusting entry would you advise, the Factory Ledger being controlled by the General Ledger?
3. Suppose the shortage (question No.2) was traced to an error in accounting for material requisitions issued during a previous cost period, what adjustments would you advise?
4. In a case where numerous samples are given away for advertising, or other selling purposes, what provision would you make as a means of accounting for them?

5. If a physical inventory is to be taken as at close of business Dec. 31, which will comprise a variety of small moveable items, what preparatory measures would you take for ensuring the greatest possible degree of accuracy, assuming the factory operations are not to be suspended whilst the inventory is taken?
6. If the market value of an inventory exceeds the cost value which of the values should be used for pricing the inventory? Why?
7. If the time of workmen in a factory is utilized during a dull period, for constructing factory equipment at a cost of \$2500.00, and similar equipment could have been purchased in the market for \$2000.00, which of the two values would you charge as the book value of the asset so constructed?
8. If your answer to question No. 7, is the market value, what disposition would you make in the accounts of the difference between the two values?
9. If a machine in department A is transferred to department B, involving the following expenditures:

Labor—Removal from A to B.

Disengaging from foundation in A	\$35.00
Transferring machine to B	18.00

Foundations.

Foundation in A destroyed, book value	\$75.00
Foundation in B cost	275.00

How would you adjust the asset accounts, assuming there are no other considerations involved?

10. Suppose all the machines in a department were transferred to, and installed in, another department, how would you compile the costs of the transfer?

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SEVENTEENTH LESSON

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1913

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SEVENTEENTH LESSON

SUBJECT: MATTERS REQUIRING CAREFUL CONSIDERATION IN THEIR RELATION TO A COST SYSTEM.

(Collateral reading, chapter 24.)

The student has previously been made aware of the fact that no two industries—even though of the same kind—are conducted in such an identical manner, as that the same cost system would apply to both. The Cost Accountant will be required to provide special means for dealing with the varying conditions which will most certainly be encountered in every system he may devise, which means, that he must have a thorough knowledge of the principles, and methods for their application.

This knowledge, coupled with a reasonable degree of business sagacity will enable him to provide a system which will meet the requirements of any industry. A competent Cost Accountant will know that a cost system must conform to the requirements of a business, he will, therefore, carefully avoid any attempt to conform the business to the requirements of a cost system.

The competent Cost Accountant will avoid unnecessary, or injudicious, clerical work, that is, he will not require clerical work which is disproportionate to the value of the information gained. For instance, the question will often arise as to the extent to which clerical effort should be employed in determining whether a cost shall be treated as a direct cost, or as an indirect cost. In these cases, as a rule, the correct procedure will be determined by the importance of the matter with respect to its effect upon the costs of the factory. If the results involved do not warrant the effort to distinguish between the two classifications, by all means follow the practical course, and classify the cost as indirect.

The head of a Cost Department may confidently expect to receive the respect and appreciation of Executives and Managers, in direct proportion to the value of the information which they receive from a Cost System. This implies a necessity for conferring with Executives and Managers, for the purpose of ascertaining their requirements, before planning the system, to the end that provision may be made for statistical information of a special character. In a general way, the information required from a cost system will be embraced by Financial Statements and Operating Statements covering each principal operation, each department, and the Factory as a whole.

If a cost system imposes an unreasonable amount of clerical work upon factory employees, thereby unduly interfering with routine work, the system will assuredly be a failure.

This possibility should be avoided by conferring with managers and foremen, for the purpose of discussing suggestions they may be able to make from actual experience. It must always be conceded that their familiarity with existing conditions enables them to offer suggestions which are entitled to respect.

In most cases, parts of an existing system will be found to possess such merit as that they may be advantageously incorporated in a system which it is proposed to install. Other parts, with slight changes, may be similarly used. It

may be taken as a certainty that whenever such adaptations are possible, and are taken advantage of, to that extent the friction inevitable with a new system will be removed.

We do not, of course, advocate the abandonment of any vital principle in order to secure this result. We do, however, wish to impress upon the student the fact that cases are rare in which an existing cost system is absolutely destitute of good points which may be advantageously used in providing an improved system.

Careful consideration must be given to making the necessary preparations for putting a cost system in operation.

Assuming that the proposed system is the result of the Cost Accountant's skill, aided by the practical experience of qualified employees, the necessity remains for issuing instructions—preferably in written form—to the various managers, foremen, and clerks who will be brought in contact with the operation of the system. After they have had an opportunity to study the instructions, the Cost Accountant should personally confer with them for the purpose of discussing any points they may not clearly understand, and for considering any suggestions they may make.

If the Cost Accountant proceeds in the manner outlined by the foregoing, he will accomplish better results than if he goes upon the assumption that nothing possesses merit which is not of his personal creation.

QUESTIONS FORMING THE SEVENTEENTH EXAMINATION.

1. To what extent is a cost system applicable to a mercantile business, that is, a business conducted solely for buying and selling?
2. What are the three prominent divisions which constitute factory expenditures?
3. From what principal sources are the expenditures, referred to in question 2, obtained?
4. What is the procedure in accounting for production?
5. Referring to the application of overhead, prior to its distribution to product, how would you apply the following:
 - (a) Overhead applicable to a process operation?
 - (b) Overhead applicable to a department in which several distinct operations may be carried on?
 - (c) Overhead of a non-productive department?
 - (d) Overhead, represented by general operating expenses?
6. Describe the procedure and object of costing the sales?
7. State concisely, but clearly, why factory transactions must be summarized at the end of each cost period?
8. What proof is it possible to make, at the end of each cost period, with respect to:
 - (1) Stores of Raw Materials?
 - (2) Work shown to be in Process?
 - (3) Stores of part finished Stock?
 - (4) Stores of finished Stock?

9. If a separate factory ledger is kept, how would you prove its mathematical accuracy, assuming that the ledger was not self-balancing?
10. What precautions would you take for establishing the accuracy of Factory Ledger Balances before using a Trial Balance as a basis for the preparation of financial statements?
11. Assuming you were required to prepare a cost system, what procedure would you adopt from the commencement to the completion of your duties? Arrange your answer in natural order of sequence.
12. If you were required to install the cost system, referred to in question No. 11, what procedure would you adopt? Arrange your answers in natural order of sequence.

10. It is possible that the ledger was not
correctly, assuming that the ledger was not

11. What precautions would you take to establish the accuracy of the ledger?
12. How do you check the ledger for errors?

13. Assuming the ledger is correct, how do you check the accuracy of the ledger?
14. How do you check the ledger for errors?

15. How do you check the ledger for errors?
16. How do you check the ledger for errors?

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EIGHTEENTH LESSON

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EIGHTEENTH LESSON

SUBJECTS: EXAMINATION OF A PLANT AS A PREREQUISITE TO
DEVISING A COST SYSTEM. CONSIDERATIONS AFFECTING
THE INSTALLATION OF A COST SYSTEM.

(Collateral reading, chapters 25 and 26.)

We have previously stated that any attempt to employ a Cost System which does not conform to the particular conditions existing in the Plant, will assuredly result in failure.

The risk of such an eventuality is reduced by making a systematic and thorough study of the conditions before formulating a system. This procedure is covered by the expression "Examination of a Plant."

At the outset, a clear understanding should be had with the management as to the scope which the proposed system is to cover. In this connection it is not to be assumed that the examining accountant is to be entirely led by the wishes of the management. Managers, as a rule, are not trained in accounting detail, and it will generally be the case that the accountant can make suggestions which managers will welcome. In fact, this is one of the primary objects to be gained by employing the services of a Cost Accountant. On the other hand, it is generally the case that managers are largely influenced by a desire to reduce clerical expenses. Unuseful, or unrequired detail is, of course, to be avoided, but, no detail should be omitted which is required for expressing a vital principle.

The procedure herein outlined, for the examination of a Plant, is one generally applicable.

A plant may be operated with a greater or lesser number of departmental divisions, the principles, however, remain unchanged.

In the course of an examination, a watchful alertness should be maintained for evidence of inefficient, extravagant, or careless methods. Such derelictions should be carefully noted, even though they occur in connection with matters which have only an incidental bearing upon the examination. For instance, careless methods may be noticed in the store-rooms. Stores may not be carefully segregated, or placed on shelves or in bins. They may be scattered upon the store-room floor. Scrap material may be indiscriminately piled without reference to its separate values. Iron, copper, zinc, lead, all have a separate scrap value. If piled together, they must be separated and graded before it is possible to dispose of them to advantage.

Any economies resulting from the accountants observation will tend to strengthen the confidence of the management in his efforts.

The accountant should proceed upon the theory that it is impossible to obtain too much information, and that a system which is based upon insufficient information stands in peril of failure, therefore, the information must be of the fullest character possible, and it must be compiled clearly and systematically, each subject being kept quite separate. For this purpose, a loose-leaf note book would be appropriate. The subjects, and notations may then be filed and indexed in any order in which they are to be dealt with in formulating the system.

The examination should take a course which, as nearly as possible, coincides with the manufacturing routine of the Plant, which would usually be the following:

(1) The Receiving Department:

An examination of this department would extend to the manner in which the department is advised of incoming merchandise, the manner in which arrived merchandise is accounted for, the forms of records used, the duties performed by each employee of the department, and to the question of proper responsibility attaching. The manner in which the department surrenders the merchandise should be similarly investigated. Incoming raw materials, supplies, returns from customers, in fact, all purchases and inward returns will usually pass through the department; its importance therefore, will be immediately perceived.

(2) Store-Room Department:

The continuity of movement will, with few exceptions—such as delivering incoming material directly to a factory operation—be from the receiving department to the store room, the latter is therefore the next subject for attention.

The examination would be particularly concerned with the manner in which the stores are housed, the facilities provided for keeping various classifications separate, the existing classifications, existing records for incoming stores, outgoing stores, stores on hand, and the procedure followed in delivering any part of the stores to the operating departments, or for shipment. Responsibility for safe custody of the stores, is a very important consideration, the examination should therefore be directed to it somewhat upon the following lines:

- (a) Does the responsibility attach exclusively to one person?
- (b) If so, by what means is it accomplished?
- (c) If two or more employees are engaged in the department, what are their individual duties?
- (d) Are employees, engaged in other departments, admitted to the store rooms?

If the existing system has been in any manner controlled by the books of account, or if the stores records have provided a perpetual inventory, though not controlled, information should be obtained as to how the perpetual inventory has compared with the last three or four physical inventories. A blank of each form used by the department should be filed with the Accountant's notes.

After his examination of the Store-Room Department, the accountant will be familiar with the forms of requisition issued by the operating departments. Adhering to the continuity in movement of materials, his attention should next be directed to the operating departments, commencing with the initial operation and proceeding with each successive operation until the product is finally withdrawn from operation, as finished or part finished stock. A study of factory operations is, in effect, a study of productive routine. The object sought is the determination of points, or divisions at which the costs may be collected with a greater degree of accuracy than would be possible if such points, or divisions were not established, and affording a means of comparing the costs of similar operations for varying periods.

A well planned classification of operating divisions will enable the direct application of expenditures which otherwise would be classed as General Overhead.

After determining a point, or division, which constitutes an operation, a careful examination of the attaching conditions should be made, such for instance as:

- (a) Is the operation under special supervision, or is supervision lodged with an operative?
- (b) Is the operation (as in the case of a casting produced in a foundry) to appear separately upon the Sales Invoice, or is it one of several progressive operations, which, as finished product is to be billed by units?
- (c) What part of the operation is done by machine, and what part by hand?
- (d) Does the operation require varying degrees of skill in hand labor, or in operating the machine?
- (e) Are the materials requisitioned as required for definite quantities of product to be operated upon, or are they requisitioned in bulk, to be used as required?
- (f) How many operatives does the operation require and what are the duties of each?

The suggested information will enable the accountant to devise the system by which the costs of the operation are to be reported.

The skill required in devising a Cost System receives its most severe test from the manner in which the system recognizes, and deals with the development of the product, by natural manufacturing stages, until the completed stage is reached. Manufacturers, as a rule, estimate costs from the bases of the various operations through which the product passes.

It will be apparent to the student that a thorough technical knowledge of the business under examination is necessary, and that the manufacturing conditions of that particular business must also be understood, the examining accountant therefore should not entirely rely upon his own observations in his progress through the plant. He should be accompanied by an executive or employee who is competent to explain and discuss the factory routine.

Having now completed his examination of the Receiving, Store-room and Operating Departments of the Plant, the accountant may turn his attention to contributory departments, such as, Purchasing, Engineering and Drafting, Pattern Making, Mechanical or Repairing, Planning and Routing, Employment, Tool-room, Selling, Shipping, and Power Plant. These departments must be examined for the same purpose and much in the same way, as those previously referred to, the object being to ascertain the methods under which they are conducted, as to personnel of the employees, their duties, the accounting details, and to provide classifications for ascertaining the costs.

The system of wage payment, reporting labor, and preparing the Pay-roll, will then require attention. These subjects are closely allied.

The system of wage payment will, to some extent, govern the form of labor reports to be used, and the manner in which labor is reported will influence pay-roll construction.

The examination should extend to the entire area of the plant, that is, outside areas—spaces not occupied by shops—such areas are generally found to be gathering ground for nondescript materials, scrap machinery, etc., etc.

Finally the examination will terminate with the General Offices, and the Cost Department.

At these points, the accountant has an opportunity to study the executive organization. He should ascertain the duties and responsibilities of each executive and clerk, how the duties relate to the various activities of the Plant, and to what extent, if any, proper co-ordination is lacking.

The General and Cost Accounting systems must be carefully studied, to ascertain the extent to which control of factory accounts is provided, and as to the forms of financial and statistical statements which it has been the custom to render, and the periods covered by such statements. In this connection, the existing system of billing sales should receive careful attention. A more efficient system may be possible by using one of the several multiplex methods now available.

As previously stated, an examination cannot be too thorough. The accountant should enter upon the task with the determination to leave nothing undone which may weaken the value of the system to be devised. The accomplishment of his purpose will largely depend upon the taking of logically connected lines of progression from the commencement to the end of the examination.

As a final admonition, we would point out the importance of being absolutely sure that the examination has covered all of the usual activities of the plant. It may be the case that at the time of making the examination, certain lines of product were not in operation, owing to the limitations of a particular season of the year. To guard against this possibility, and to bring changing manufacturing conditions under observation, the examination should extend to the records of the plant for a full year.

Considerations Affecting the Installation of a Cost System:

We have previously referred to the preparatory measures in connection with factory routine, which should precede the installation of a cost system. In addition, there are certain preparatory steps to be taken in connection with the accounting routine.

The first of these relates to the beginning inventory, which should be represented by a most carefully taken Physical Inventory, which should be reconciled with the stores records and controlling accounts. The inventory should then be classified in conformity with the classifications provided by the system. If stores records, or controlling accounts, have not previously been kept, it will be necessary to commence them.

If there is any work in process in the beginning inventory, classifications will be required which conform to those provided by the system, and cost sheets must be prepared to cover them. This requirement relates to unfinished work under either the special order or process method of cost-finding.

If fixed percentages for overhead distribution have previously been used, it will be necessary to carefully consider their applicability to the new system, revising them if necessary. If no systematic method was previously employed for distributing overhead, it will be necessary to examine the accounting records of past periods for the purpose of establishing percentages to be used with the new system.

Thereafter, the installation will be completed by putting into use such books of account, factory orders, forms of factory and accounting reports, as the system may require.

QUESTIONS FORMING THE EIGHTEENTH EXAMINATION.

1. In the course of examining a plant, you find that the cartages required for the receiving and shipping departments are made by trucks owned and operated by the factory, and by trucks owned and operated by cartage contractors, under a contract with the factory. Assuming it is not practicable to restrict the cartage which each facility is to do, would you consider it necessary to separately account for the cartage done by the facility owned and operated by the Factory? Give the reasons which would influence you in dealing with the matter.
2. Scrap metal is often a source from which considerable revenue is derived, by using it productively in the factory, and by selling it. Give a concise outline of the methods you would employ for storing scrap and accounting for scrap used, and scrap sold.
3. In determining product classifications, which department executive would you consider it wise to consult?
4. If your conference with executives developed the fact that they held very different ideas as to the scope which a proposed cost system should cover, what course would you follow?
5. Assuming you are devising a Cost System and that you find the plant assets are stated upon the accounting records in one amount, as "Machinery, etc." what object would you endeavor to attain with respect to the account?
6. Assuming a cost system is to be installed, and that the beginning inventory shows the following:

Raw materials "R. M. 1" store-room No. 1	\$20,000.00
Raw materials "R. M. 2" store-room No. 1	8,000.00
Finished Product "p. 3"	12,000.00
Finished Product "p. 5"	14,000.00
Work in process "p. 5" Materials	6,000.00
Work in process "p. 5" Labor	8,000.00
Work in process "p. 5" Overhead	1,200.00
Part-finished product "A" (Held in store-room)	3,000.00
	<u>\$72,200.00</u>

How would you deal with the Inventory in connection with the installation, assuming the classifications to be correct and that a factory ledger (not previously in use) is to be installed.

7. Explain why predetermined percentage rates are used for distributing overhead.
8. State your understanding of overhead cost, its application, its liquidation by means of predetermined percentages, and final disposition of any difference which the predetermined percentages did not exactly liquidate?

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NINETEENTH LESSON

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NINETEENTH LESSON

SUBJECT: ELEMENTARY COST SYSTEMS.

(Collateral reading, chapter 27.)

Occasions will be met with, in which a manufacturer does not favor the installation of a cost system sufficiently detailed to provide a perpetual inventory, yet, he requires a monthly financial statement exhibiting the results of his business, as nearly approximating actual conditions as may be possible. Any system by which this is accomplished would be considered an elementary system.

If the material, labor, and overhead costs in a factory are constant in their relation to the selling price of the product, that is, if any fluctuations in these costs are reflected in similar changes in the selling price of the product, the gross profit (over manufacturing cost) will be constant. If this is the case, it will be possible to satisfactorily determine the percentage which the gross profits bears to the sales, from which the cost of the sales may be approximately determined. If the cost of the sales is approximately determined, it will be possible to approximately determine the value of a merchandise inventory monthly, or at the end of a cost period, by deducting the cost of the sales from the total manufacturing charges, including the amount of the beginning inventory. Finally, if the ending merchandise inventory is approximately determined, estimated financial statements may be prepared.

The following illustration will serve to make the procedure clear:

Assume that a physical inventory taken at the end of a year shows a value of \$125,500.00, and estimated monthly inventory is thereafter to be made so that monthly financial statements may be made during the year, until another physical inventory is taken.

Assume also the following:

Purchases during the first month were	\$32,750.00
Productive Labor Cost was	20,120.00
Factory Overhead Cost was	3,840.00
The Sales amounted to	73,860.00

The gross profit during the previous year was 38 per cent of the sales. From the above stated details, the ending inventory would be estimated, as follows:

Merchandise Inventory at commencement of the period	\$125,500.00
---	--------------

Add:

Charges during the period:

Merchandise Purchases	\$32,750.00	
Productive Labor	20,120.00	
Factory Overhead	<u>3,840.00</u>	<u>56,710.00</u>

Total Factory charges during the period.	\$182,210.00
--	--------------

Deduct:

Estimated Cost of Sales, 62 per cent of \$73,860.00	\$45,793.20
(The Gross Profit for the previous year is stated as 38 per cent, therefore the Cost of the Sales was 62 per cent.)	

Estimated value of the Ending Inventory	<u>\$136,416.80</u>
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The establishing of a value for the ending inventory would enable the preparation of an estimated statement of Assets and Liabilities, and an estimated Manufacturing and Profit and Loss Statement. The qualification, estimated, is necessary in connection with financial statements prepared from an inventory arrived at in the foregoing manner, as an explanation of the fact, that the statements are based upon an estimate.

The estimate in the illustration is confined to the cost of the sales. The accuracy of the profit shown by a financial statement would depend upon the accuracy with which the gross profit of 38 per cent, shown for the previous period, represents the gross profit for the current period. Our meaning, when we stated that manufacturing costs must be constant, in their relation to selling prices—will now be clear. If the costs do not exhibit the requisite constancy, the estimated inventory will be relatively inaccurate, the extent of such inaccuracy being ascertainable only when the next physical inventory is taken.

The method described above may be used in cases where various lines of product are manufactured, provided classifications are established for inventories, departments, and product. Records would be also required showing materials and supplies requisitioned, and used by each department, the object being to apply the percentage of gross profit (as in the illustration) to each department, or line of product, thereby making it possible to estimate the cost of the sales of each, resulting in an estimated inventory for each merchandise classification.

A complete cost system would require an ascertainment of the cost of each sales invoice, whereas—if the requisite conditions of constancy exist—a sufficiently approximate statement may be arrived at by the illustrated method, which deals only with the total sales of each classification, and it eliminates the clerical work involved in keeping a perpetual inventory upon the Stores records.

Estimated inventories are of course, subject to verification by frequent inventory tests between the taking of physical inventories. This measure of proof should be utilized to the fullest possible extent.

QUESTIONS FORMING THE NINETEENTH EXAMINATION.

1. Assuming that a cost system does not provide a perpetual inventory, or detailed costs from which the cost of sales may be determined, and that the last physical inventory was taken as at Dec. 31, 1919, would it be possible to prepare satisfactory financial statements as at Jan. 31, 1920, from a trial balance at that date? Explain.
2. Referring to the previous question, if financial statements were possible, how would you designate them, assuming they are a Balance Sheet, and Manufacturing and Profit and Loss Statement, and what items thereon would you particularly qualify?
3. What are the conditions which must exist in order that an estimated inventory may be reasonably approximate?
4. Would the undermentioned items give you all requisite information from which to estimate a merchandise inventory?
 - (a) The Beginning Inventory.
 - (b) Merchandise Purchases.
 - (c) Productive Labor Charges
 - (d) Overhead Charges
 - (e) The Sales

5. Referring to question No. 4, if your answer is in the affirmative, explain how your estimate would be made. If your answer is in the negative, explain why you would be unable to make the estimate.
6. What are the business conditions to which an elementary unit method for ascertaining costs is particularly applicable?
7. Assume the following:

Sales during the year 1919	\$360,000.00
Cost of the Sales	270,000.00
Gross Profit	90,000.00
Merchandise Inventory, Dec. 31, 1919	120,000.00

and the following Factory Expenditures for January, 1920:

Merchandise Purchases	\$40,000.00
Productive Labor Charges	15,000.00
Overhead Charges	3,000.00

and the Sales for January were \$30,000.00

show how you would estimate the Merchandise Inventory at January 31, 1920.
8. Without going into the detailed arrangement of records required, briefly describe two methods, by which the units required for arriving at unit costs, may be systematically ascertained.

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J. LEE NICHOLSON INSTITUTE OF COST ACCOUNTING

STANDARD BASIC COURSE

TWENTIETH LESSON

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UNIVERSITY MICROFILMS

TWENTIETH LESSON

SUBJECT: ESTIMATING COST SYSTEMS. (Collateral reading, chapter No. 28.)

An Estimating Cost System is an elementary system, its purpose being to verify estimated cost details without the employment of a detailed cost system. The verification is accomplished by actually accounting for the total cost, or for each element of cost which has entered into the estimated cost.

Estimated costs based upon previous costs, modified by current conditions, are incorporated in the accounting system by means of classifications which conform to the classifications used in the estimated costs, thus providing for a comparison of the estimated and actual results.

The utility of an estimating cost system is confined to the manufacture of a distinct article, or group of articles, continuously being made.

By way of illustrating an estimating cost system, in its simplest form, we will consider it in connection with an industry producing a single article, the estimated cost of which is scheduled as follows:

Schedule of Estimated Cost for a Single Article

Cost of Materials	\$1.26
Labor Cost	.84
Overhead Cost	.16
Total Estimate Cost	<u>\$2.26</u>

Having prepared the Schedule of Estimated Costs, shown above, the procedure for operating the estimating system would be as follows:

Assuming the Commencing Inventory to show:

Materials in Store-room	\$12,600.00
500 Finished Articles on Hand.	
1000 Unfinished Articles in Process of Manufacture,	
in the following Stages of Completion:	
60 per cent, as to Materials	
45 per cent, as to Labor	
10 per cent, as to Overhead	

From these details, using the Schedule of Estimated Costs as a basis, the commencing inventory would take the following form:

Analysis of Commencing Inventory

Description	Total	Materials	Labor	Overhead
Materials (Store-room)	\$12,600.00	\$12,600.00		
Finished Articles on Hand	1,130.00	630.00	\$420.00	\$80.00
Uncompleted Articles	<u>\$1,150.00</u>	<u>756.00</u>	<u>378.00</u>	<u>16.00</u>
Analyzed Inventory	<u>\$14,880.00</u>	<u>\$13,986.00</u>	<u>\$798.00</u>	<u>\$96.00</u>

The next step is to arrive at the Estimated Cost of Sales, using as the basis the Schedule of Estimated Costs previously shown. Assuming the sales to have been 2,000 articles, the estimated cost of the sales would take the following form:

Estimated Cost of Sales

Description	Total	Materials	Labor	Overhead
2000 Articles	<u>\$4,520.00</u>	<u>\$2,520.00</u>	<u>\$1,680.00</u>	<u>\$320.00</u>

In order to provide a comparison between the Estimated and Actual Costs, we will assume the following to have been the remaining transactions:

Material Purchased	\$6,220.70
Labor Cost (wages paid)	2,922.80
Overhead Expenses	606.50

The Ending Inventory is assumed to show:

Materials in Store-room	\$14,360.00
Finished Articles on Hand	2,000
Unfinished Articles in Process	1,000

completed as to:

Materials 65 per cent.

Labor 42 per cent.

Overhead 35 per cent.

An analysis of the ending inventory would show the following details, based upon the schedule of estimated costs.

Analysis of the Ending Inventory

Description	Total	Materials	Labor	Overhead
Materials (Store-room)	\$14,360.00	\$14,360.00		
2000 Finished Articles	4,520.00	2,520.00	\$1,680.00	\$320.00
1000 Unfinished Articles	1,227.80	819.00	352.80	56.00
Analyzed Inventory	<u>\$20,107.80</u>	<u>\$17,699.00</u>	<u>\$2,032.80</u>	<u>\$376.00</u>

Turning our attention to the verification of the Estimated Costs, we find the Ledger Accounts, show the following:

Ledger Accounts	Dr.	Cr.
Materials:		
Inventory at Commencement, per analysis	\$13,986.00	
Purchases during the Period	6,220.70	
Credit, per Estimated Cost of Sales		\$ 2,520.00
Ending Inventory, per analysis		17,699.90
Difference (Cost over-estimated)	12.30	
	<u>\$20,219.00</u>	<u>\$20,219.00</u>
Labor:		
Inventory at Commencement, per analysis	\$ 798.00	
Wages paid during the Period	2,922.80	
Credit, per Estimated Cost of Sales		\$1,680.00
Ending Inventory, per analysis		2,032.80
Difference (Cost under-estimated)		8.00
	<u>\$3,720.80</u>	<u>\$3,720.80</u>
Overhead:		
Inventory at Commencement, per analysis	\$ 96.00	
Charges during the Period	606.50	
Credit, per Estimated Cost of Sales		\$320.00
Ending Inventory, per analysis		376.00
Difference, (Cost under-estimated)		6.50
	<u>\$702.50</u>	<u>\$702.50</u>

Now that the Estimated Costs and the Actual Costs have been brought together, the following differences are seen to exist:

Materials	Per Ledger	Actual	Over-estimated	Under-estimated
Inventory	\$17,686.70	\$17,699.00	\$12.30	
Labor				
Inventory	2,040.80	2,032.80		\$8.00
Overhead				
Inventory	382.50	376.00		6.50
	<u>\$20,110.00</u>	<u>\$20,107.80</u>	<u>\$12.30</u>	<u>\$14.50</u>

The comparison shows a net difference of \$2.20, which is accounted for by the cost of materials having been slightly over-estimated, and the labor and overhead costs having been slightly under-estimated. The estimates for future periods would have required revision, if the differences had been considerable in amount.

The illustration shows that the verification is accomplished by comparing each element of the estimated cost with the estimated cost of the same element estimated to be in the ending physical inventory. It, therefore, follows that an estimating system is dependent upon an actual physical inventory for verification, and that the greatest possible degree of care is required in forming the estimates, and taking the inventory. Inventory tests should be frequently made.

The student will perceive that estimating systems are particularly applicable to industries carried on under constant, and simple conditions.

The illustration covers a single article, the method, however, may be extended to several articles, if provision is made for separately proving the estimated costs of each.

QUESTIONS FORMING THE TWENTIETH EXAMINATION.

1. In what two principal features does a completely detailed cost system differ from an estimating cost system?
2. If you were required to install an estimating cost system for the purpose of verifying the estimated cost of each element entering into the manufacture of each of several different articles, what records—other than the books of account—would you require?
3. Referring to question 2, explain the operation of the system.
4. If an estimating cost system is to verify the total cost only, what records are required in addition to the Books of Account?
5. What special accounts would be required on the Ledger, for the purpose of proving the estimates?
6. How would the special accounts be operated upon the Ledger?
7. What is the purpose of the special accounts?
8. Referring to questions 4 to 7, if the estimating cost systems covered different classes of articles, for which the verification is made in one total only, to what extent could reliance be placed upon the estimates, if the estimated costs were found to be approximately (or even exactly) the same as the actual costs?

9. Referring to question 5, how would you dispose of the special accounts after the verification is completed?
10. Consider the following conditions, relative to an estimating cost system for a single article:

The Material Cost was estimated as	\$9.74
The Productive Labor Cost	5.26
The Overhead Cost	<u>1.00</u>
Total Estimated Cost	\$16.00

Owing to differences in classification (material and labor classed as direct in the estimates, were classed as indirect in the accounts) the following were found to be the actual costs:

Materials	\$9.50
Productive Labor	5.16
Overhead	<u>1.34</u>
Total Actual Cost	\$16.00

Give your opinion of the result, and state what course you would advise, and to what end.

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STANDARD BASIC COURSE

TWENTY-FIRST LESSON

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TWENTY-FIRST LESSON

SUBJECTS: CLASSIFICATION OF FACTORY LEDGER ACCOUNTS: MANUFACTURING CONTRACTS BASED UPON COST:

The accounts in a factory ledger are largely formed from original entries made upon comparatively small report forms, which are usually numerous and varied. The Ledger Accounts to be indicated upon the forms are generally conducted under governing classifications, of which each account is a sub-classification.

The number of accounts, the number of classifications to be provided for, the limited space upon the original record, and the necessity for automatic Ledger indexing, are considerations which demand a well planned system of accounts classification.

The student knows the reasons why a standard cost system is an impossibility. For precisely the same reasons, a standard system of accounts classification is an impossibility. Standard methods, however, are possible.

The objects to be gained by a system of accounts classification are principally the following:

- (1) To obviate the necessity for writing classifications and sub-classifications, at length upon the factory forms and records.
- (2) To provide a ready and effective means for identifying classifications, and sub-classifications, by the use of indicants.

Capital letters of the alphabet may be advantageously used as indicants for principal classifications, and numerals for sub-classifications, or numerals and small letters of the alphabet may be used in cases where more than one sub-classification is required.

The following will serve to exemplify the use of capital letters for a principal classification, and numerals for sub-classifications.

B—Banks:

1—First Nat'l, 2—Guaranty Trust, 3—2nd, Nat'l.

C—Items Receivable:

1—Notes Receivable, 2—Customers A-G.

3—Customers H-N, 4—Customers O-Z

Thus B1, would indicate the First National Bank, B2, the Guaranty Trust, B3, the Second National Bank. C1 would indicate Notes Receivable, C2 Customers Ledger A-G, C3, Customers Ledger H-N, C4, Customers Ledger O-Z.

The following will serve to exemplify the use of capital letters for a principal classification, numerals for a principal sub-classification, and small letters for a further sub-classification:—

J—Accruing Manufacturing Expense:

1—Plant

a—Repairs, b—Depreciation, c—Taxes

2—Power

a—space charges, b—Engineers and Assistants.

c—Repairs.

d—Generating Steam:

1—Labor, 2—Fuel, 3—Water, 4—Sundries.

e—Miscellaneous items.

f—Distribution of overhead.

Thus, J1a, would indicate repairs, J1b, Depreciation, J1c, Taxes, all chargeable against accruing manufacturing expense, "a/c Plant."

J2a, would indicate the proportion of rent, J2b, the wages of engineers and assistants, J2c, Repairs, all chargeable against accruing manufacturing expense, "a/c Power." J2d1, would indicate labor, J2d2, fuel, J2d3, water, J2d4, sundry expenses, all chargeable to accruing manufacturing expense—a/c "Generating Steam," which would ultimately be closed into the account "Power," of which it is a sub-classification.

From the foregoing exemplifications it will be seen that the clerical work of indicating the captions of the various accounts is greatly reduced. In the case of the principal classification "J" and the sub-classifications "2", and "d", the use of "J2d1" accomplishes the purpose which would—if written at length, require the writing of four captions. Furthermore, "J2d1" instantly shows the relation of the sub-classifications to the principal classification, thus, "1" is a sub-classification of "d", which is a sub-classification of "2", which is a sub-classification of "J".

The letters of the alphabet are usually sufficient to cover principal classifications, without repetition. If this is not the case, classifications may be continued under capital and small letters, thus—Aa, Bb, Cc, etc.

A chart of the complete classifications should be prepared, upon stiff card, a space being provided between the principal classifications for any additional sub-classifications which may afterwards be required. The chart should show the principal indicants in alphabetical order, irrespective of the alphabetical order of the account indicated, and an attached chart should show the accounts in alphabetical order irrespective of the alphabetical order of the indicants. The first chart would take the form exemplified herein with respect to "Banks", "Items Receivable" and "Accruing Manufacturing Expense". The other chart would be shown thus:—

Customer's Ledger A-G	C2
Customer's Ledger H-N	C3
Customer's Ledger O-Z.....	C4
Depreciation—Plant	J1b
Engineers and Assistants—Power	J2b
First National Bank	B1
Fuel—Generating Steam	J2d2
Guaranty Trust	B2
Labor—Generating Steam.....	J2d1
Notes Receivable	C1
Repairs—a/c Plant	J1a
Repairs—a/c Power	J2c
Second National Bank.....	B3
Space Charges—a/c Power	J2a
Sundries—Generating Steam	J2d4
Taxes—a/c Plant	J1c
Water—Generating Steam	J2d3

The foregoing arrangements of the charts provide a ready means for determining the accounts which indicants represent, or conversely, indicants which are to be used for the accounts.

Several variations of the use of letters, as indicants, are possible, particularly in connection with distinct factory operations reported upon special forms. In these cases, the forms are more or less descriptive of the operating details, therefore, the use of letters, as indicants, may be recommended for each operation. It will then be possible to combine the letters in a manner which will convey their meaning to anyone familiar with the manufacturing process. Thus, if "M" denotes machine, "S" denotes supplies, "O" denotes oils, "W" denotes waste, "MSO" would denote the use of oil as a machine supply, and "MSW" would denote the use of waste as a machine supply.

This method has the advantage of immediate suggestion, since each letter is the commencing letter of the word which it represents.

As previously stated, the method to be employed will depend upon its applicability to existing conditions.

Some method is required by every cost system, and it is a duty of the cost accountant to provide it when devising a Cost System, or when existing classifications are found to be inadequate.

SUBJECT: MANUFACTURING CONTRACTS BASED UPON COSTS (Collateral reading, chapter No. 31.)

The efficiency of the Cost Department of a factory is subjected to a severe test when the department is called upon to furnish a statement of the cost incurred in connection with a contract based on a given percentage of profit upon cost. This form of contract is steadily growing in the favor of Contractees and Contractors.

When costs are uncertain for any length of time by reason of advancing prices for materials and labor, a fixed price for contract work is likely to be inequitable to one or the other of the contracting parties, hence the employment of the more satisfactory method of limiting the contractor's profit to a given percentage of the cost.

Manufacturing costs incurred under a contract are subject to precisely the same cost accounting principles as costs not incurred under a contract. A contract imposes governing conditions, which must be strictly observed. Even though the contract defines, or regulates the costs, an extensive contract would usually develop contingencies not specifically provided for. In such cases, disputed cost charges would be largely settled by the intent of the contract, and by the ability of the Contractor to substantiate the disputed charge as being an item of cost. The following illustration shows where certainty ends, and uncertainty begins, in respect of a Contractor's ability to substantiate a charge for cost, as being a proper charge:—

A manufacturer enters into a contract conditioned upon the production of a given product at manufacturing cost, plus a fixed profit thereon of 10 per cent.

Upon completion of the contract, the cost records show:—

Materials used	\$50,000.00
Productive labor employed	35,000.00
Overhead charges	3,500.00

Total Manufacturing Cost, per cost records	<u>\$88,500.00</u>
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The contractor bills the contract as follows:—

Materials used	\$50,000.00
Productive Labor employed	35,000.00
Overhead charges	5,000.00
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Total cost	\$90,000.00
Profit, per contract, 10 per cent	9,000.00
<hr/>	
	<u>\$99,000.00</u>

The contractee is satisfied with the prime cost charges, but the overhead charge of \$5,000.00 appears to be excessive, he therefore, requests an itemized statement of the overhead, which is furnished, showing the following:—

Details of Overhead Charges:—

Proportion of Departmental Overhead, per schedule	\$2,250.00
Proportion of General Factory Overhead, per schedule	750.00
Proportion of Administrative Overhead, per schedule	500.00
Proportion of Interest on borrowed Capital, per schedule	1,500.00
<hr/>	
Overhead, per bill rendered	<u>\$5,000.00</u>

The Contractee admits the overhead charges amounting to \$3,500.00, he, however, takes exception to the charge of \$1,500.00, as “proportion of Interest on borrowed Capital,” contending that the interest is not a manufacturing cost. In this case, the contractor’s ability to certainly substantiate the costs ended, and uncertainty began, with the interest charge of \$1,500.00. His position would have been strengthened if his cost records showed that he invariably treated the interest as a manufacturing cost. In any event, conclusive determination of the matter might involve judicial decision. The amount at issue would be Interest \$1,500.00, plus 10 per cent \$150.00, a total of \$1,650.00.

We illustrate this matter for the purpose of showing the importance of having a clear statement of the elements—as far as they may be foreseen—which shall constitute cost, in a contract based upon cost.

Costs which cannot be foreseen, and for that reason not specifically provided for in a contract, are always governable by modifications of the contract, which should be obtained by the contractor as the necessity arises.

The mere fact that a contract is based upon manufacturing cost, and a fixed percentage of profit upon the cost, implies a right of the contractee to receive a sufficiently detailed statement of the costs, even though it is not so stipulated in the contract. Work done under such a contract differs, in this respect, from work done under ordinary commercial conditions, therefore, the accounting methods must necessarily differ. In accounting for the costs of a contract based upon cost, it is necessary to carry the direct application of overhead to a degree of greater refinement than is considered essential in the case of the regular commercial business of the factory, for the reason that details of the overhead will usually be required by the contractee. Uncertainties, as to the equitable charging of overhead by means of arbitrary proratings, should be reduced to the lowest possible point, thereby removing causes for disagreement.

The cost department, in conjunction with officials who possess the requisite technical knowledge, should be the factor to be relied upon for properly protecting the interests of the contractor, when a contract is formulated.

QUESTIONS FORMING THE TWENTY-FIRST EXAMINATION

(1) The following details relate to classifications of accounts used by an Axle Manufacturing Company.

The work in process accounts are distinguished by Capital letters, and the sub-classifications by numerals, as follows:

K—Horse drawn axles:—

K1—Material, K2—Labor, K3—Expense, K4—Machine time.

L—Pleasure Auto Axle:—

L1—Material, L2—Labor, L3—Expense, L4—Machine time.

M—Commercial Auto Axle:—

M1—Material, M2—Labor, M3—Expense, M4—Machine time.

The investments are distinguished by Capital letters, and sub-classifications by numerals and small letters, as follows:

Q—Investments:

1—Stocks and Bonds:

Q1a—bonds, Q1b—stock.

2—Plant:

Q2a—Real Estate, Q2b—Axle Building.

Q2c—Horse drawn axle building.

Q2d—Pleasure auto axle building.

Q2e—Commercial auto axle building.

3—Machinery and Equipment:

Q3a—Axle Department.

Q3b—Horse drawn axle department.

Q3c—Pleasure auto axle department.

Q3d—Commercial auto axle department.

From the foregoing details prepare a chart of the classifications, in the form which you consider would meet all requirements.

(2) Assume a contract to be entered into, which is based upon manufacturing costs, plus a profit of 10 percent upon the costs, no further qualifying conditions being made.

The process of manufacture required a special tool, which was purchased, at a cost of \$150.00, and its value was completely used upon the contract, no residual value remaining.

If the material costs were.....	\$25,000.00
Productive Labor Costs.....	18,500.00
Overhead Costs.....	500.00
Cost of special tool.....	150.00

Show the cost of the contract in detail, and the amount of the manufacturer's profit thereupon.

(3) Referring to question No. 2, give similar information if the special tool had a residual value of \$50.00 at the completion of the contract.

(4) Referring again to question No. 2, show the cost of the contract in detail, and the amount of the manufacturer's profit thereupon, if the special tool

were manufactured in the factory, at a cost of \$140.00, and no residual value remained at the completion of the contract.

(5) Referring again to question No.2, suppose the special tool (purchased for \$150.00) was capable of further service at the completion of the contract, but not in connection with the business of the contractor, he, therefore, does not wish to consider any proposition for acquiring the tool. Show the cost of the contract in detail and the amount of the Manufacturer's profit thereupon, and state how the tool should be disposed of.

(6) Assuming the following:—

A Foundry operates a single cupola which under normal conditions, suffices for melting iron and composite metals, by using it alternately. A contract is to be entered into which requires the continuous production of Iron Castings for a period of 3 months. In order to meet this condition and keep pace with regular business in Iron Castings, and provide for the composite castings required by business not covered by the contract, a temporary cupola for melting composite metals is to be constructed, by the factory employees, at a cost of \$500.00, and it is to be demolished upon completion of the contract, no residual value remaining. The contract, is to provide for cost, plus a profit of 10 per cent upon cost. If you, as head of the cost department, are required to formulate the contract, how would you deal with the expenditure of the \$500.00 in question.

(7) If a contract is entered into on the basis of cost, plus a specified percentage of profit on cost, and the contractor purchases materials for the contract, costing \$5,000.00, which were worth \$5,500.00 in the open market at the time of purchase, what amount would the contractor be justified in charging against the contract for materials purchased.

Subsequent lessons will be devoted to Cost Accounting problems. The problems are designed to test the student's knowledge of the subjects, covered by the course; they therefore commence with comparatively simple conditions and progressively take up more complex conditions.

J. LEE NICHOLSON INSTITUTE OF COST ACCOUNTING

STANDARD BASIC COURSE

TWENTY-SECOND LESSON

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Chicago

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TWENTY-SECOND LESSON

SUBJECT: PROBLEMS FORMING THE TWENTY-SECOND LESSON.

It is the purpose of the remainder of the course, to extend the student's knowledge of cost accounting by a series of examinations which, from comparatively simple conditions, develop the practical requirements of more complex conditions.

Problem No. 1:

The purpose of the problem is to test the student's ability to present financial statements in cases where a definitely ascertained merchandise inventory is not available, but where the costs and product are sufficiently standard to enable an approximate estimate of the merchandise inventory to be made. The problem also involves ability to present the required statements in an orderly manner.

The following is a list of balances shown by the General Ledger, as at January 31, 1920:

Cash—Central Trust Co.	\$13,134.90
Cash—Petty Cash Fund	300.10
Accounts Receivable	116,720.80
Machinery, Equipment & Fixtures	46,279.20
Real Estate (Factory use)	30,000.00
Factory Buildings	80,000.00
Accounts Payable	40,230.60
Notes Payable	5,769.40
Capital Stock	300,000.00
Reserve for Depreciation—Machinery and Equipment..	6,500.00
Surplus	\$29,500.00
Merchandise Sales	62,780.00
Merchandise Inventory, January 1st, 1920.....	100,216.40
Materials purchased	42,783.60
Pay-Roll—Productive Labor	5,300.90
Pay-Roll—Non-Productive Labor	1,299.10
Freight and Cartage Inward	117.50
Freight and Cartage Outward	232.50
Light, Heat and Power—Factory.....	225.00
Miscellaneous Factory Expenses	315.00
Office Salaries	3,685.00
Taxes—Real Estate, Factory	350.00
Repairs—Factory	320.00
Selling Expenses	3,500.00

The student will observe that the foregoing balances are not classified as to debit and credit balances. It is assumed that the descriptions are sufficient for the purpose of distinguishing the debit balances from the credit balances.

Before proceeding with the solution of the problem, it will be necessary to prepare a Trial Balance from the foregoing list of balances. It will assist the student in constructing the required financial statements, if he indicates the

financial statement in which each balance must appear by entering No. 1, No. 2, or No. 3, on the left hand margin of the Trial Balance.

The financial statements required are—in their natural order—as follows:

(1) **Manufacturing statement**—see page 298 of collateral reading.

The accounting system, which provided the list of ledger balances given with the problem, does not show the merchandise inventory on hand at any time other than when a physical inventory is taken.

The business, however, is assumed to be conducted under the following conditions:

- (a) The product is standard.
- (b) The costs (material, labor, and overhead) maintain a constant relation to the selling price, that is, any fluctuations in the costs are accounted for by similar fluctuations in the selling price, so that the percentage of gross profits is uniformly maintained.
- (c) The gross profits of previous years have confirmed the relation to selling prices referred to under (b), and estimated inventories have closely conformed to physical inventories.

Under the foregoing conditions, the merchandise inventory—as a whole—may be approximately estimated. Where this is possible and one standard product is manufactured, the manufacturing results may be obtained with a sufficient degree of accuracy to dispense with the clerical details which would be required in accounting for a perpetual inventory.

The manufacturing statement required by the problem, should commence with the merchandise inventory at January 1, 1920, and end with the estimated inventory at January 31, 1920, thus:—

Commencing inventory, plus direct and indirect charges (detailed) arriving at total factory charges, from which the estimated cost of sales is to be deducted, leaving the estimated ending inventory.

- (2) **The Profit and Loss statement**, made possible by the estimated cost of sales shown upon the manufacturing statement, will show the estimated net profit to be transferred to the Balance Sheet. In previous lessons we referred to the importance of supplementing the details, shown by the figures, by a tabulation showing percentages of the costs to the sales. In the present instance, such percentages as you deem to be important should be shown.
- (3) **The Balance Sheet**—made possible by the manufacturing statement, and the Profit and Loss statement, should be prepared in an orderly manner, so that the financial condition of the business, may be clearly ascertained from a brief inspection. In other words, it should not be necessary to analyze any part of it.

The figures to be placed upon the left margin of the Trial balance as previously stated—will indicate the statement upon which each is to appear, therefore, No. 1 will indicate the Manufacturing Statement, No. 2 will indicate the Profit and Loss Statement, No. 3 will indicate the Balance Sheet. By this means, it will be possible to readily construct each statement.

Conditions of the problem:

Depreciation of Machinery and Equipment is to be provided for at the rate of 10 per cent per annum upon the asset amount, 95 per cent of the depreciation being chargeable to the factory, and 5 per cent chargeable to administrative expenses.

The operations of the factory during past periods show the manufacturing costs to have been 75 per cent of the sales.

From the foregoing details prepare:—

A Manufacturing Statement for January 1920.

A Profit and Loss Statement for January, 1920.

A Balance Sheet, at January 31, 1920.

Problem No. 2.

This problem involves ascertaining an inventory from details kept in the books of account, without the necessity for maintaining separate stock records. The method to be followed, and its applicability are covered by collateral reading, page 455, with reference to unit costs.

The following details relate to a retail coal business. The account keeping system is double entry, the ledger accounts of coal purchased, and coal sold being arranged to show the quantities in addition to the values.

Purchases of coal are made on the basis of 2240 lbs. per (long) ton.

Sales are made on the basis of 2000 lbs. per (short) ton.

The details entering into the problem are:—

- (a) At June 30, 1920, 2,240,000 lbs. of coal were on hand, valued at \$6,720.00.
- (b) The purchases during July were 3360 tons, of 2240 lbs. each, invoiced at \$22,578.60.
- (c) The sales during July were 3780 tons, of 2000 lbs. each, amounting to \$30,240.00.
- (d) Experience has shown that a shrinkage of $\frac{1}{4}$ of 1 per cent occurs in handling coal.

The shrinkage will be represented by slightly different proportions, depending upon the hardness or softness of the coal. In a large business, several varieties of coal may be handled each variety being separately purchased, stored, and delivered. Each such variety would require separate accounting classifications, and if the business in each was sufficiently extensive to warrant a separation of the operating expenses, they should be appropriately classified, with the object of showing the financial results from each classification. In this case, the proportion of loss by shrinkage would be determined for each classification, and the ending inventory, for any period, adjusted.

The conditions of the problem, assume one grade of coal only to be dealt in, therefore, the shrinkage of $\frac{1}{4}$ of 1 per cent is to be taken into account in arriving at the inventory at July 31st.

The following were the expenditures for July:

(e) Pay Roll and Salaries:

Labor in yard	\$300.00
Labor, delivering to yard	510.00
Labor, delivering sales	1,050.00
Supervision (General)	225.00
Office Salaries	375.00

For the purpose of illustrating the methods presented by the problem, the labor in yard, and delivering to yard, is considered as chargeable to the operations for the month of July. If large stocks are maintained in the yard, it would probably be advisable to separate the labor charges somewhat as follows:

Yard labor:

- (1) Labor, piling incoming stock.
- (2) Labor, loading outgoing deliveries.
- (3) Sundry yard labor.

Labor delivering to yard:

- (4) Should be confined exclusively to labor charges for delivering purchases of coal to the yard.

Under the above stated classifications, the charges for (1) and (4) would be added to the purchase cost of the coal, so that its yard or inventory value would consist of the purchase cost, plus the expense of installing it. This value would be correct for both Inventory and fire loss purposes.

(f) The charges for transportation during the month were as follows:—

(1) Garage labor	\$200.00
(2) Truck Repair	320.00
(3) Depreciation of Equipment	150.00
(4) Truck supplies used	480.00

These charges are based upon the assumption that the equipment was owned by the business, therefore, any charges incurred in respect to incoming coal should be dealt with in the same manner as the charges referred to in connection with yard labor and labor delivering to the yard.

Briefly stated, all expenditures made in acquiring the coal piled in the yard, should represent its cost. When purchases are graded and sifted at the yard, preferential values should be assigned to the resulting grades, the total value thus assigned being equal to the total of the purchase price, to which should be added the cost of grading upon a tonnage or other equitable basis.

(g) The remaining expenditures during July were:—

(1) Rent	\$250.00
(2) Insurance (proportion)	30.00
(3) Sundry Office Expenses	98.00

(h) In addition to the aforementioned information, the following balances also appear upon the Ledger at July 31, 1920:

Cash	\$4,800.00
Accounts Receivable	17,437.40
Accounts Payable	6,250.00
Taxes prepaid	116.00
Insurance unexpired	150.00
Yard and Equipment	10,240.00
Office Furniture & Fixtures	240.00
Reserve for Depreciation	720.00
Capital Stock	25,000.00
Undivided Profits June 30, 1920.	4,660.00
Supplies, Inven. July 31, 1920	600.00

From the foregoing details, prepare the following:

Trading and Profit and Loss Statement for July, 1920, showing also the average per ton of each item of income and expenditure, and of the net profit.

Balance Sheet at July 31st, 1920.

Details of the Coal Account, as it should appear upon the Ledger after closing, showing quantities and costs, in respect of:—

Inventory at June 30, 1920.

Purchases for July 1920.

Cost of July 1920 Sales.

Shrinkage for July 1920.

Inventory at July 31, 1920.

ing, showing the relation of the various parts of the system to the whole, and the effect of the various parts on the whole.

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

J. LEE NICHOLSON INSTITUTE OF COST ACCOUNTING

STANDARD BASIC COURSE

TWENTY-THIRD LESSON

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TWENTY-THIRD LESSON

PROBLEM I.

VERIFICATION OF ESTIMATED COSTS.

(Collateral Reading, Part 6, Chapter 28.)

The verification provided by the problem, is confined to the total material cost, total labor cost, and total overhead cost, each being separately proved. The proof does not extend to product classifications, the three above stated elements of cost being taken for the aggregate of product.

Assuming a manufacturing business is engaged in turning out 7 different lines of product, the factory costs being estimated to be as follows:

Product	Total Cost	Material Cost	Labor Cost	Overhead Cost
1	\$4.20	\$2.80	\$.80	\$.60
2	5.10	3.50	.95	.65
3	5.50	4.00	.82	.68
4	6.15	4.50	.95	.70
5	6.80	4.75	.85	1.20
6	8.40	6.00	1.00	1.40
7	9.70	6.10	1.60	2.00
	<hr/> \$45.85	<hr/> \$31.65	<hr/> \$6.97	<hr/> \$7.23

The foregoing schedule of estimated costs covers each product of the factory; hence all factory expenditures, during the period for which the estimated costs are to be compared (verified) with the actual costs, must be shown upon the Ledger under the appropriate caption, as material, labor, or overhead. Each class of factory product in the beginning and ending Inventories of the period, and in the Sales for the period, must be divided into the three elements of cost which are to be the subjects of verification.

The Inventory at January 1, 1920, after its division into the three elements of estimated cost, showed the following:

Product	Quantity on hand	Estimated cost of unit of product:		
		Material	Labor	Overhead
1	600	\$2.80	\$.80	\$.60
2	500	3.50	.95	.65
3	600	4.00	.82	.68
4	300	4.50	.95	.70
5	400	4.75	.85	1.20
6	450	6.00	1.00	1.40

The pricing of the commencing Inventory—shown above—is in accordance with the costs shown by the schedule of estimated costs preceding. It will be observed that there was no stock of product No. 7.

The expenditures for the period under verification were:

Materials purchased	\$47,000.00
Productive labor	10,964.00
Overhead	10,025.00

The sales during January 1920, were:

Product	Quantity Sold	Selling Price
1	3200	\$5.00
2	2600	6.00
3	2000	6.50
4	1700	7.25
5	1200	8.00
6	1000	9.80
7	700	11.20

The Inventory at January 31, 1920, to be divided into the three elements of estimated cost showed the following:

Product	Quantity on hand
1	500
2	600
3	400
6	400
7	200

The solution of the problem may readily be accomplished by an observance of the instructions given in Chapter 28 of the collateral reading.

The following Ledger Accounts are required:

Material Account
Productive Labor Account
Overhead Expense Account
Sales Account
Balancing Account

The "Balancing Account" serves the purpose of providing for double entries, and it accomplishes the feature of control.

The Inventories used are supposed to be (must always be) actual physical Inventories. If the totals of material, labor, and overhead shown by the ending Inventory do not respectively agree with the balances of those accounts as shown by the Ledger, adjusting entries are to be made for bringing the Ledger Accounts (Book Inventory) into agreement with the actual Inventory.

Prepare the necessary forms, and record thereon the foregoing details.

Post the details shown by the forms—as original entries—to the appropriate Ledger Accounts.

Prepare a trial balance of the accounts after all postings and adjustments have been made.

Submit a copy of each of the foregoing accounting requisites.

VERIFICATION OF ESTIMATED COSTS FURTHER DEVELOPED.

The preceding problem was confined to verifying each element of cost which entered into 7 products taken collectively. The solution of the problem shows a close approximation of estimated and actual costs, nevertheless, if the verification had been extended to each class of product according to classifications of materials used in departments and departmental labor and overhead, differences might have been shown to exist between the estimated and actual costs of certain products, which were not shown by the former verification.

We will now develop the method exemplified by the previous problem, by extending it to cover the following:

Verification of Estimated Costs of each class of
several products, based upon the classification of
material used in different departments, and upon the
labor and overhead costs of such departments.

The result of this development will be a more detailed verification of the estimated costs by means of more extended classifications.

In order that the more extended verification may be clearly connected with the books of account, we give the following as a trial balance at January 1, 1920:

Trial Balance at January 1, 1920.

	Dr.	Cr.
J 1 Cash	\$20,000.00	
J 1 Accounts Receivable	15,000.00	
J 1 Merchandise Inventory	17,215.00	
J 1 Machinery and Equipment	30,000.00	
J 1 Accounts Payable		\$10,435.00
J 1 Notes Payable		4,500.00
J 1 Undivided Profits		17,280.00
J 1 Capital Stock		50,000.00
	\$82,215.00	\$82,215.00

The departmental classifications for material and labor are represented by departments A and B, as shown by the following:

Schedule of Estimated Costs.

Product	Material		Labor		Overhead	Total
	Dept. A	Dept. B	Dept. A	Dept. B		
1	\$1.68	\$1.12	\$.48	\$.32	\$.60	\$4.20
2	2.10	1.40	.57	.38	.65	5.10
3	2.40	1.60	.49	.33	.68	5.50
4	2.70	1.80	.57	.38	.70	6.15
5	2.85	1.90	.51	.34	1.20	6.80
6	3.60	2.40	.60	.40	1.40	8.40
7	3.66	2.44	.96	.64	2.00	9.70
	\$18.99	\$12.66	\$4.18	\$2.79	\$7.23	\$45.85

The foregoing schedule does not differ from the schedule of estimated costs used in the previous problem, except in the departmental divisions applied to the material and labor costs.

The merchandise Inventory at January 1, 1920 is classified as follows:

Classification of Merchandise Inventory at January 1, 1920.

Product	Material		Labor		Overhead	Total
	Dept. A	Dept. B	Dept. A	Dept. B		
1	\$1,008.00	\$672.00	\$288.00	\$192.00	\$360.00	\$2,520.00
2	1,050.00	700.00	285.00	190.00	325.00	2,550.00
3	1,440.00	960.00	294.00	198.00	408.00	3,300.00
4	810.00	540.00	171.00	114.00	210.00	1,845.00
5	1,140.00	760.00	204.00	136.00	480.00	2,720.00
6	1,620.00	1,080.00	270.00	180.00	630.00	3,780.00
Raw Materials						500.00

\$7,068.00	\$4,712.00	\$1,512.00	\$1,010.00	\$2,413.00	\$17,215.00
------------	------------	------------	------------	------------	-------------

The Inventory shown for each class of product, represents finished stock and work in process of manufacture. The raw material shown by the Inventory will be dealt with hereafter.

The sales are to be grouped under the following classifications:

Products 1 and 2	Sales X
Products 3-4-5	Sales Y
Products 6 and 7	Sales Z

Accounts for the foregoing classifications will be required upon the ledger.

The Expenditures, during January, were:

Materials purchased		\$47,000.00
Productive Labor:		
Operating Dept. A.	\$6,578.40	
Operating Dept. B.	\$4,385.60	10,964.00
Overhead-details below		10,025.00
Selling-details below		3,000.00
Administrative-details below		2,000.00
Particulars of Overhead Expense:		
Indirect labor		\$7,595.00
Supervision		800.00
Factory Supplies		180.00
Light, Heat and Power		520.00
Factory Rent		450.00
Insurance (Factory)		75.00
Depreciation:		
7½% per annum, on Machinery and Equipment		\$187.50
Repairs		167.50
Maintenance		50.00
Total Overhead		\$10,025.00

Particulars of Selling Expenses:

Salesmen's Salaries	\$500.00
Commissions	150.00
Traveling Expenses	650.00
Advertising	1,600.00
Office Expenses	100.00
	<hr/>
	\$3,000.00
	<hr/>

Particulars of Administrative Expenses:

Salaries	\$1,945.00
Light and Heat	20.00
Insurance	10.00
Office Expenses	25.00
	<hr/>
	\$2,000.00
	<hr/>

The following expenditures are to be entered upon a Purchase Record (Form 50 Collateral Reading, page 246) and the necessary postings made therefrom to the ledger. One ledger, only, is assumed to be in use:

Raw materials purchased
Factory Supplies
Light, Heat & Power (Factory)
Factory Rent
Insurance (Factory)
Repairs & Maintenance
Advertising

The charge for depreciation should be passed through the Journal. The remaining items of expenditure are to be posted directly from the Cash account, as cash transactions.

The cash collections during the month were \$65,000.00, and payments amounting to \$45,000.00 were made on the accounts payable.

The necessary Cash account should be opened upon the ledger, commencing with the cash on hand at January 1st, shown by the trial balance at that date.

A summary of the bills of material for the month, showed the following particulars: (See form 17, collateral reading page 85. This form must be modified somewhat, to meet the requirements of the problem.)

Product	Units of products for which materials were used:	
	Dept. A	Dept. B
1	3200	3200
2	1500	1500
3	1000	1000
4	1400	1400
5	800	800
6	950	950
7	900	900

This summary furnishes, in conjunction with the schedule of estimated costs, the details necessary for charging the respective operating classifications and crediting the raw material account.

The sales made during the month were as follows:

Product	Units sold	Rate
1	3200	\$ 5.00
2	2600	6.00
3	2000	6.50
4	1700	7.25
5	1200	8.00
6	1000	9.80
7	700	11.20

A physical Inventory was taken at the end of the month (January 31st) for the purpose of testing the estimated costs, and it showed the following:

Product	Material		Labor		Overhead
	Dept. A	Dept. B	Dept. A	Dept. B	
1	\$ 700.00	\$400.00	\$150.00	\$125.00	\$250.00
2	900.00	600.00	250.00	180.00	300.00
3	800.00	400.00	150.00	100.00	200.00
6	1,200.00	800.00	200.00	120.00	400.00
7	600.00	400.00	160.00	100.00	300.00
	<hr/> \$4,200.00	<hr/> \$2,600.00	<hr/> \$910.00	<hr/> \$625.00	<hr/> \$1,450.00

Raw materials on hand amounted to \$7,800.00.

From the details hereinbefore given, prepare the records and accounts necessary to exhibit the transactions, close the accounts for the month and prepare the requisite financial statements.

The requisite records, accounts and statements are as follows:

Analysis of Inventory at January 1st, showing the postings therefrom to the ledger. (See Form 101, page 467 of collateral reading.)

Purchase Record, showing postings to the ledger. (See Form 50, page 246 of collateral reading.)

Summary of Bills of Material showing postings to the ledger. (See Form 17—page 85 of collateral reading.)

Pay Roll Analysis Form 56—page 263 of collateral reading.

Analysis of Sales and Cost of Sales, showing postings to the ledger. (Refer to chapter 18, page 276 of collateral reading.)

In addition, the student is required to show the journal entries and ledger accounts in detail, a trial balance at January 31, 1920, a Profit and Loss statement for the month, (See Form 77, page 344 of collateral reading) and a Balance sheet.

It is, of course, understood that the forms referred to in the collateral reading are to be modified when necessary—to meet the requirements of the problem.

The accounting procedure is explained by the following:

Journal Entry "A". The entry places the commencing trial balance upon the exemplification of the ledger, which the student requires.

Classification of Merchandise Inventory at January 1st. The classification resolves the Inventory—\$12,280.00—into the components of the estimated costs.

Journal Entry "B". This entry accounts for the depreciation provided by the problem. Upon the Balance sheet, the amount of depreciation reserve may be shown as a liability, or it may be deducted from the property asset. If the latter course is adopted, the deduction must be set out.

Purchase Record. Ordinarily, the form would be required to show the number of each Invoice, the name of the creditor, and a description of each purchase. The simplified conditions of the problem provide for the amount and distribution of each Invoice only, therefore, the various totals of the working accounts, the individual amounts in the "Miscellaneous Column", and the amount which affects the controlling account, "Accounts Payable", are the only postings to be made from the form.

Summary of Bills of Material. This record presents the details, given in the problem, in classification order and shows the material costs in accordance with the schedule of estimated costs. The totals are to be posted from the form to the credit of raw materials, and charged to the respective operating departments.

Analysis of Pay Roll. This record places the pay roll under the classifications required by the problem. The totals are to be posted from the form to the various accounts affected.

Analysis of Sales and their Costs. This record is to be prepared by the student, and the form is to show postings to the ledger.

The solution of the problem is considerably facilitated by the working details which we have hereinbefore supplied, the student should therefore be readily able to carry the solution to completion, after studying the partial solutions given.

The student is requested to accompany his solution of the problem with a complete set of forms showing the ledger postings made therefrom, including the forms which we have exemplified. Complete Records are also to accompany the solution.

I.

Journal Entries			Dr.	Cr.
Entry "A"		January 1st, 1920.		
"	L 1	Cash	\$20,000.00	
"	L 2	Accounts Receivable	15,000.00	
"	L 31a	Merchandise Inventory	17,215.00	
"	L 9	Machinery & Equipment	30,000.00	
"	L 10	To Accounts Payable		\$10,435.00
"	L 11	To Notes Payable		4,500.00
"	L 12	To Undivided Profits		17,280.00
"	L 13	To Capital Stock		50,000.00

To open ledger accounts, per trial balance given as at January 1st.

2.

Entry. "B"				
"	L 21	Depreciation	\$187.50	
"	L 14	To Reserve for Depreciation		\$187.50
		For the month of January, 1920.		

Classification of Merchandise Inventory at January 1st, 1920.

Product	Material		Labor		Overhead	Total
	Dept. A	Dept. B	Dept. A	Dept. B		
1	\$1,008.00	\$672.00	\$288.00	\$192.00	\$360.00	\$2,520.00
2	1,050.00	700.00	285.00	190.00	325.00	2,550.00
3	1,440.00	960.00	294.00	198.00	408.00	3,300.00
4	810.00	540.00	171.00	114.00	210.00	1,845.00
5	1,140.00	760.00	204.00	136.00	480.00	2,720.00
6	1,620.00	1,080.00	270.00	180.00	630.00	3,780.00
Raw Materials					L3.	500.00
	\$7,068.00	\$4,712.00	\$1,512.00	\$1,010.00	\$2,413.00	\$17,215.00
	L 4	L 5	L 6	L 7	L 8	L 31a

Purchase Record
January 1920.

Date	Accounts payable	Raw Material	Factory Supplies	Repairs and Maint'ce	Factory Insurance	Factory Rent	Miscellaneous		
							Account	Fol.	Amount
Jan. 31st	\$47000 00	\$ 47000 00							
	180 00		180 00						
	520 00								
	450 00						Light, Heat and Power	L 19	\$ 520 00
	75 00				75 00	450 00			
	167 50			167 50					
	50 00			50 00					
	1600 00								
	\$ 50042 50	\$ 47000 00	180 00	217 50	75 00	450 00	Advertising	L 20	1600 00
	L 10	L 3	L 15	L 16	L 17	L 18			2120 00

Summary of Bills of Material

January 1920.

Product	Units of Product	Material				Total			
		Dept. A		Dept. B.					
		Rate	Amount	Rate	Amount	Rate	Amount		
1	3200	\$1.68	\$5376.00	\$1.12	\$3584.00	\$2.80	\$8960.00		
2	1500	2.10	3150.00	1.40	2100.00	3.50	5250.00		
3	1000	2.40	2400.00	1.60	1600.00	4.00	4000.00		
4	1400	2.70	3780.00	1.80	2520.00	4.50	6300.00		
5	800	2.85	2280.00	1.90	1520.00	4.75	3800.00		
6	950	3.60	3420.00	2.40	2280.00	6.00	5700.00		
7	900	3.66	3294.00	2.44	2196.00	6.10	5490.00		
			\$23700.00		\$15800.00		\$39500.00		
		L 4		L 5		L 3			

Analysis of Pay Roll January 1920.

Description	Pay Roll	Operating Dept.		Indirect Labor	Supervision	Salaries General Office
		A.	B.			
Productive Labor, A	\$6578 40	\$6578 40				
Productive Labor, B	4385 60		4385 60			
Indirect Labor	7595 00			7595 00		
Supervision	800 00				800 00	
Salaries General Office	1945 00					1945 00
	\$21304 00	\$6578 40	4385 60	7595 00	800 00	1945 00
C. B.		L 6	L 7	L 25	L 26	L 27

SOLUTION OF PROBLEM No. 2.

Journal entries, A & B—previously exemplified—copy to be returned by the student.

Schedule of Estimated Costs—previously exemplified, copy to be returned by the student.

Classification (Analysis) of Merchandise Inventory, previously exemplified, copy to be returned by the student.

Journal entry B—previously exemplified—copy to be returned by the student.

Purchase Record—previously exemplified—copy to be returned by the student.

Summary of Bills of Material—previously exemplified—copy to be returned by the student.

From this point the solution follows in due order of procedure.

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STANDARD BASIC COURSE

TWENTY-FOURTH LESSON

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TWENTY-FOURTH LESSON

Problem.

Applicable to the manufacture of special orders, the costs being gathered against each order. The indirect expenses are distributed on the basis of the cost of direct labor.

Conditions of the Problem:

The following are trial balances, at January 1, 1920:

General Ledger

Cash	\$22,150.00	
Accounts Receivable	29,100.00	
Notes Receivable	2,000.00	
Plant and Equipment	62,250.00	
Notes Payable		\$ 10,000.00
Vouchers Payable		32,500.00
Undivided Profits		5,500.00
Factory Ledger	42,500.00	
Surplus		10,000.00
Capital		100,000.00
	<u>\$158,000.00</u>	<u>\$158,000.00</u>

Factory Ledger

Raw Materials	\$30,000.00	
Work in Process	12,500.00	
General Ledger		\$42,500.00
	<u>\$42,500.00</u>	<u>\$42,500.00</u>

The merchandise inventories at January 1, 1920 showed the following classifications:

Raw Materials

Classification	Quantity	Cost
R. M. No. 1	12,000	\$6,000.00
R. M. No. 2	10,000	4,000.00
R. M. No. 3	25,000	5,000.00
R. M. No. 4	30,000	6,000.00
R. M. No. 5	20,000	5,000.00
R. M. No. 6	40,000	4,000.00
		<u>\$30,000.00</u>

Work in Process

Order No.	Material	Labor	Overhead	Total
1250	\$5,750.00	\$2,500.00	\$500.00	\$8,750.00
1280	2,050.00	1,485.00	215.00	3,750.00
	<hr/> \$7,800.00	<hr/> \$3,985.00	<hr/> \$715.00	<hr/> \$12,500.00

During the month of January, 1920, the following special orders were put in work, each order requiring the operation as shown:

The operations are to be considered as being descriptive only, that is, although several orders may undergo the same descriptive operation, the work done upon each during the operation may vary. The costs of each operation are to be shown upon the cost sheets, for comparative purposes with similar operations in the past, or which may be required in the future.

Order No.	Operation Completed	Operation Required
1250	1	2
1280	1	3
1281		1 and 2
1282		2 and 3
1283		1 and 4
1284		3 and 4

Additional raw materials were required. Purchasing instructions were issued January 5, and a Purchase Order was issued January 6 (see chapter 6 of collateral reading), the materials—duly received—being in accordance therewith. The following are the details:

Materials Received

Classification	Quantity	Price
R. M. No. 1	20,000	.50
R. M. No. 2	15,000	.40
R. M. No. 3	30,000	.20
R. M. No. 4	20,000	.20
R. M. No. 5	30,000	.25

The above stated materials received January 10, 1920 were included in one shipment, freight charges being \$800.00.

Each class of material is to bear its proportion of the freight, based upon the relation of its individual quantity to the total quantity received.

In the regular course of actual practice, a separate production order would be required for each of the special orders. For the purpose of eliminating the detail which would be required if separate forms were prepared for the solution of the problem, the student may prepare a single form embracing each order with distinctness. (See "Factory Orders", chapter 5 of collateral reading.)

The details, necessary for the preparation of the form, are:

- Order No. 1250—Dated Dec. 15, 1919—wanted Jan. 15, 1920.
- Order No. 1280—Dated Dec. 17, 1919—wanted Jan. 18, 1920.
- Order No. 1281—Dated Jan. 1, 1920—wanted Jan. 15, 1920.
- Order No. 1282—Dated Jan. 5, 1920—wanted Jan. 18, 1920.
- Order No. 1283—Dated Jan. 15, 1920—wanted Feb. 8, 1920.
- Order No. 1284—Dated Jan. 20, 1920—wanted Feb. 12, 1920.

During January, Materials and Supplies were requisitioned, as shown by the following summary, and duly delivered for work upon the orders:

Order No.	Description	Quantity	Operation	Cost
1250	R. M. No. 1	5,000	No. 2	\$ 2,521.50
1280	R. M. No. 2	12,000	No. 3	4,850.08
1281	R. M. No. 3	15,000	No. 1	3,057.00
1281	R. M. No. 1	10,000	No. 2	5,043.00
1282	R. M. No. 5	40,000	No. 2	10,168.00
1282	R. M. No. 4	30,000	No. 3	6,084.00
1283	R. M. No. 6	35,000	No. 1	3,500.00
1283	R. M. No. 1	15,000	No. 4	7,564.50
1284	R. M. No. 2	13,000	No. 3	5,254.26
1284	R. M. No. 3	25,000	No. 4	5,095.00
				<hr/>
				\$53,137.34

The cash transactions for the month were as follows:

Cash Received:

From Accounts Receivable	\$32,194.60
From Notes Receivable	850.00

Cash Payments:

On Vouchers Payable	\$45,120.10
On Notes Payable	3,500.00

In order to avoid the necessity for preparing a form of Cash book, enter the cash transactions in the Ledger Account "Cash" and post therefrom.

The undermentioned expenditures, for the month of January 1920, are to be entered upon a Voucher Register (see page 252 of collateral reading), and posted therefrom to the General Ledger, or to the Factory Ledger, as the case may require. "Vouchers Payable" is to be credited with the total.

Raw Materials	\$33,500.00
Freight on Raw Materials	800.00
Supplies	450.00
Repairs and Maintenance	275.00
Insurance, Factory	175.00
Taxes, Factory property	80.00
Stationery and Printing, Factory	35.00
Telephone and Telegrams, Factory	17.00
Light, Heat and Power, Factory	212.00
Salaries, Factory, Office	600.00
Superintendence, Factory	250.00
Direct Labor	8,500.00
Indirect Labor	750.00
Legal Expense	50.00
Light and Heat, General Office	30.00
Sundry Expenses, General Office	25.00
Salaries, Sales Department	800.00
Commission to Salesmen	1,200.00
Traveling Expenses, Salesmen	2,400.00
Advertising	3,000.00
Salaries, General Office	2,400.00

Total Expenditures

\$55,549.00

Depreciation, at the rate of $7\frac{1}{2}$ per cent per annum is to be provided—through the Journal—upon the amount of the asset value of Plant and Equipment, shown by the trial balance at January 1st. The entire amount is to be considered as an indirect factory expense.

The factory pay roll for January included in list of expenditures previously given, covered:

Direct Labor	\$8,500.00
Indirect Labor	750.00
Superintendence	250.00

The direct labor (as above) was compiled from time reports, summarized as follows:

Order No. 1250—Operation No. 2	\$1,054.00
“ “ 1280 “ “ 3	1,081.00
“ “ 1281 “ “ 1	1,485.00
“ “ 1281 “ “ 2	1,270.00
“ “ 1282 “ “ 2	1,140.00
“ “ 1282 “ “ 3	890.00
“ “ 1283 “ “ 1	760.00
“ “ 1284 “ “ 3	820.00
	<hr/>
	<u>\$8,500.00</u>

A form of Pay Roll is to be prepared, which will suffice to record the foregoing details as to the wages payable only. See page 259 of collateral reading.

The production orders were in the following condition at January 31st:

Order No. 1250—Completed
“ “ 1280 Do
“ “ 1281 Do
“ “ 1282 Do
“ “ 1283 In process
“ “ 1284 Do

The Sales during January were:

Order No. 1250	\$15,908.00
“ “ 1280	12,536.86
“ “ 1281	14,878.63
“ “ 1282	23,817.66

From the details herein given, prepare the following:

All forms necessary to record the transactions, except a cash book. As previously stated, the cash account in the Ledger may be used as a posting medium, for the purpose of reducing detail work upon the problem. In this connection instead of providing a cost sheet for each order, (as would ordinarily be required) a single cost sheet may be used, but the costs for each order are to be separately shown.

A Profit and Loss Statement for January.

A Balance Sheet at January 31st, 1920.

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STANDARD BASIC COURSE

TWENTY-FIFTH LESSON

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TWENTY-FIFTH LESSON

PROBLEM.

Illustrating Special Order Method for finding costs of a specific order, several specific orders being embraced in one factory order. Indirect expenses distributed on the basis of direct labor cost.

The problem given in the preceding lesson dealt with special order costs, in cases where the costs were to be found and charged to each order separately.

The problem for the present lesson deals with costs for similar products, involving several customers' orders which may, nevertheless, be manufactured under a specific factory order, and the costs ascertained for and charged to such factory order.

Conditions of the Problem:

The classifications to be accounted for are:

Raw Materials	Finished Product
R. M. No. 1	F. P. No. 500
R. M. No. 2	F. P. No. 550
R. M. No. 3	F. P. No. 600
R. M. No. 4	F. P. No. 650
R. M. No. 5	
R. M. No. 6	

The listing of the classifications, as above, is not to be considered as indicating any particular relation, one with the other. Thus, finished product No. 500 may require several different classes of raw material. The actual relations between the classifications will be appropriately provided for in the conditions of the problem.

The month of January, 1920, is the period which the problem accounts for.

The merchandise inventories at January 1, 1920, showed the following classifications:

Raw Materials:

Classification	Quantity	Cost
R. M. No. 1	12,000	\$6,000.00
R. M. No. 2	10,000	4,000.00
R. M. No. 3	25,000	5,000.00
R. M. No. 4	30,000	6,000.00
R. M. No. 5	20,000	5,000.00
R. M. No. 6	40,000	4,000.00
		<hr/>
		\$30,000.00

Work in Process—F. P. No. 101—Not operated upon during January:

Material	Labor	Overhead	Total
\$7,800.00	\$3,985.00	\$715.00	\$12,500.00

Finished Product:

Classification	Quantity	Cost
F. P. No. 500	200	\$350.00
F. P. No. 600	560	450.00
F. P. No. 650	500	875.00
		<hr/>
		\$1,675.00

In order to provide for January orders, and to have an adequate stock of raw materials, a purchase requisition, and purchase order, are assumed to have been issued, and the materials duly received in accordance with the purchase order.

The details of these transactions were:

Purchase Requisition:

Number 2120—Dated January 4, 1920—addressed to J. Kahn, Purchasing Agent, Materials wanted January 8th, Stock Clerk—T. Flint—Superintendent W. Calder.

The requisition covered:

R. M. No. 1	Quantity 20,000
R. M. No. 2	Quantity 15,000
R. M. No. 3	Quantity 30,000
R. M. No. 4	Quantity 20,000
R. M. No. 5	Quantity 30,000

Purchase Order:

Number 2200, dated January 5, 1920, addressed to the Evans Mfg. Co., Chicago. The prices covered by the order were: .50 (R. M. No. 1) .40 (R. M. No. 2) .20 (R. M. No. 3) .20 (R. M. No. 4) .25 (R. M. No. 5).

Shipment was to be made via N. Y. C. Freight, to our stores, freight to be paid by shipper.

The materials were received January 8th, in good condition, inspected by S. Burt.

Production Order (Factory Order):

(See chapter No. 5 of collateral reading.)

Production Order No. 2360 (in form combined for use also as a cost sheet) was issued January 4th, covering the following:

Product	Units Required	Particulars
F. P. No. 500	15,000	Wanted Jan. 15th
F. P. No. 550	20,000	Wanted Jan. 20th
F. P. No. 600	30,000	Wanted Jan. 25th
F. P. No. 650	30,000	Wanted Feb. 12th

Material Requisitions:

(See page 82 of collateral reading.)

A material requisition was issued January 4th, which covered the following details.

Material Required		Product to be
Kind	Quantity	Manufactured
R. M. No. 1	25,000	F. P. No. 500
R. M. No. 2	20,000	F. P. No. 550
R. M. No. 3	45,000	F. P. No. 600
R. M. No. 4	35,000	F. P. No. 500
R. M. No. 5	30,000	F. P. No. 600
R. M. No. 6	10,000	F. P. No. 650

The office was duly advised that the production of F. P. No. 500, 550 and 600 was completed, the following being a summary:

Production:

Material Used			
Product	Kind	Quantity	Direct Labor
F. P. No. 500	R. M. No. 1	25,000	\$3,212.74
F. P. No. 500	R. M. No. 4	35,000	2,502.12
F. P. No. 550	R. M. No. 2	20,000	5,027.88
F. P. No. 600	R. M. No. 3	45,000	4,001.08
F. P. No. 600	R. M. No. 5	30,000	2,756.26
			<hr/>
			\$17,500.08

The following expenditures were made during the month (January, 1920) which are to be entered upon a Voucher Register (see page 252 of collateral reading) and posted therefrom to the appropriate ledger, a general ledger and factory ledger being kept.

"Vouchers Payable" is to be credited with the total of the expenditures:

Raw Materials	\$33,500.00
Repairs and Maintenance, Factory	275.00
Insurance, Factory	175.00
Insurance, General Office	25.00
Taxes, Factory property	80.00
Stationery and Printing, Factory	35.00
Stationery, General Office	15.00
Telephone and Telegrams, General Office	14.75
Telephone, Factory	17.00
Light, Heat and Power, Factory	212.00
Light and Heat, General Office	30.00
Salaries, Factory	600.00
Salaries, Sales Department	800.00
Salaries, General Office	2,400.00
Sundry Expenses, Factory	5.50
Sundry Expenses, General Office	25.00
Legal Expense	50.00
Commissions to Salesmen	1,200.00
Traveling Expenses, Salesmen	2,400.00
Advertising	3,000.00
Carried forward	<hr/> \$44,859.25

Brought forward		\$44,859.25
Pay Roll—Factory:		
Direct Labor	\$19,210.20	
Indirect Labor	712.18	
Superintendence	250.00	20,172.38
		<hr/>
Total Expenditures		\$65,031.63

The following Trial Balances were shown by the Ledgers at the commencement of the period, January 1, 1920:

General Ledger:

Cash	\$16,650.00	
Accounts Receivable	29,100.00	
Notes Receivable	2,000.00	
Plant and Equipment	62,250.00	
Notes Payable		\$10,000.00
Vouchers Payable		34,175.00
Factory Ledger	44,175.00	
Surplus		10,000.00
Capital		100,000.00
	<hr/>	<hr/>
	<u>\$154,175.00</u>	<u>\$154,175.00</u>

Furniture and fixtures, provisions for depreciation, and the possibility of bad debts, have purposely been omitted, in order to shorten the problem.

Factory Ledger:

Raw Materials	\$30,000.00	
Work in Process	12,500.00	
Finished Product	1,675.00	
General Ledger		\$44,175.00
	<hr/>	<hr/>
	<u>\$44,175.00</u>	<u>\$44,175.00</u>

The cash transactions during January were:

Cash received		
From Accounts Receivable		\$32,194.60
From Notes Receivable		850.00
Cash Payments		
On Vouchers Payable		45,120.10
On Notes Payable		3,500.00

In order to avoid the necessity for preparing a form of cash book, enter the cash transactions directly in the Ledger Account "Cash" and post therefrom.

The Sales during January were:

10,000 of F. P. No. 500	\$25,000.00
20,000 of F. P. No. 550	19,000.00
20,000 of F. P. No. 600	24,000.00

From the details hereinbefore given, provide all of the forms, Journal Entries and Ledger Accounts necessary for recording the transactions in a manner to clearly show the solution of the problem with respect to:

Trial balances of the Ledgers at January 31st.

Manufacturing and Profit and Loss Statement for January.

Balance Sheet as at January 31st.

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STANDARD BASIC COURSE

TWENTY-SIXTH LESSON

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LESSON TWENTY-SIX

Problem

The problems given in the last two lessons dealt with costs charged directly against a customer's order, and with costs charged directly against a Factory Order which enveloped several customers' orders for similar product, the costs of the separate customer's orders being an average cost. The present problem deals with the costs of product continuously manufactured for stock. Under these conditions a customer's order is filled from stock, the order, therefore, is not directly identified with the product during manufacture.

CONDITIONS OF THE PROBLEM

Three departments are involved,—A, B, C, and the costs of each are to be accounted for.

Indirect Expenses:

General Indirect Expenses are to be distributed to departments on the basis of direct labor cost. Department Indirect Expenses are to be distributed on the basis of direct labor costs.

Cost Period: Is the month ended June 30, 1919.

Inventories at May 31, 1919:

Raw Materials

Class	Quantity (lbs.)	Price	Amount
R. M. No. 3	6376	\$.40	\$2550.40
R. M. No. 5	4120	.40	1648.00
R. M. No. 7	5240	.65	3406.00
			<u>\$7604.40</u>

Part Finished Stock

Class	Quantity	Cost	Amount
No. 105	1520	\$1.02	\$1550.40
No. 106	935	2.10	1963.50
No. 107	2040	.95	1938.00
			<u>\$5451.90</u>

Finished Product

Class	Quantity	Cost	Amount
No. 800	250	\$3.705	\$ 926.25
No. 805	230	4.114	946.22
No. 820	325	3.547	1152.77
No. 910	410	6.250	2562.50
			<u>\$5587.74</u>

Work in Process

Department A	\$9527.33
Department B	2923.44
Department C	2287.16
<u>\$14737.93</u>	

**Factory transactions during June:—
Summary of Materials Received:**

Class	Quantity (lbs.)	Price	Amount
R. M. No. 3	25,000	\$.40	\$10,000.00
R. M. No. 5	25,000	.40	10,000.00
R. M. No. 7	20,000	.65	13,000.00
			<u>\$33,000.00</u>

Summary of Materials delivered to departments:

Class	Dept.	Quantity (lbs.)	Price	Amount
R. M. No. 3	A	30,000	\$.40	\$12,000.00
R. M. No. 5	B	20,000	.40	8,000.00
R. M. No. 7	C	15,000	.65	9,750.00
				<u>\$29,750.00</u>

Summary of Department Reports of Materials Used

Class	Dept.	Material used (lbs.)
R. M. No. 3	A	20,724
R. M. No. 5	B	15,307
R. M. No. 7	C	8,997
R. M. No. 3	C	4,500

Summary of Inter-Departmental Material Reports

Materials transferred	Class	Quantity (lbs.)
From Dept. A to Dept. C	R. M. No. 3	4500

Summary of Indirect Expenses

Department A	\$410.20
Department B	380.80
Department C	209.00
<hr/>	
Total for Departments	\$1,000.00
General Indirect Expenses	720.40
<hr/>	
Total	\$1,720.40

As previously stated, the indirect expenses are to be distributed on the basis of direct labor cost. The student is requested to prepare a statement covering the distribution.

Direct Labor—per analysis of Pay Roll

Department A	\$2,174.04
Department B	2,252.50
Department C	2,650.00
<hr/>	
	\$7,076.54

Summary of Part Finished Product Transferred from Operating Departments to Stores

Class	Quantity	Material	Labor	Overhead	From Dept.
No. 105	357	\$210.00	\$120.00	A
No. 106	421	598.00	225.00	B

The student is to supply the overhead cost from the statement, which he is to prepare of the overhead distribution.

Summary of Production—Finished Product

Dept.	Class	Quantity	Materials	Labor	Overhead
A	No. 800	700	\$1,569.75	\$ 792.50
A	No. 805	350	973.85	361.20
B	No. 820	850	2,096.80	722.50
C	No. 910	980	4,649.45	1,250.00
			<u>\$9,289.85</u>	<u>\$3,126.20</u>

The student is to supply the overhead cost from the statement, which he is to prepare, of the overhead distribution.

The following Trial Balances of the General Ledger exhibit the accounts of each period, after all transactions have been entered. The Balances at May 31st do not contain any Profit and Loss items. The Balances at June 30th represent the ledger before the Profit and Loss Account has been prepared.

Trial Balances of General Ledger

ACCOUNT	May 31		June 30	
	DR.	CR.	DR.	CR.
Cash	\$16,120 70		\$9,447 16	
Accounts Receivable	49,039 48		50,303 08	
Accounts Payable		\$21,240 18		\$39,000 00
Plant and Equipment	45,270 00		45,270 00	
Office Furniture and Fixtures	2,500 00		2,500 00	
Administrative Expenses			1,500 00	
Selling Expenses			2,500 00	
Reserve for Depreciation				
Plant and Equipment		3,120 00		3,346 35
Office Furniture & Fixtures		320 00		340 83
Surplus		15,000 00		15,000 00
Undivided Profits		6,631 97		6,631 97
Capital Stock		100,000 00		100,000 00
Factory Ledger	33,381 97		60,041 04	
Sales				22,380 00
Cost of Sales			15,137 87	
	<u>\$146,312 15</u>	<u>\$146,312 15</u>	<u>\$186,699 15</u>	<u>\$186,699 15</u>

A Summary of the Sales Showed the Following

Class	Quantity	Price	Amount
No. 800	800	\$5.50	\$ 4,400.00
No. 805	350	6.25	2,187.50
No. 820	1000	5.27	5,270.00
No. 910	1150	9.15	10,522.50
			<u>\$22,380.00</u>

The student is not required to prepare any Factory forms in connection with the solution of the problem, the forms having been exemplified by previous problems.

The following statements are to be prepared:

- (1) Trial Balance of the Factory Ledger at May 31, 1920.
- (2) Distribution of Indirect Expenses (Full details).
- (3) Cost of the Sales (Full details).
- (4) Manufacturing and Profit and Loss Statement for June.
- (5) Analysis of Profit and Loss Statement.
- (6) Balance Sheet at June 30, 1919.

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STANDARD BASIC COURSE

TWENTY-SEVENTH AND
TWENTY-EIGHTH LESSONS

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TWENTY-SEVENTH AND TWENTY-EIGHTH LESSONS

PROBLEM

Products manufactured from Asbestos:

The problem is based upon the Special Order and Product Methods of manufacturing, and upon the following systems of cost finding:

- Machine Cost.
- Process labor cost.
- Productive labor hours.
- Productive labor cost.

The following facts and figures have been obtained from the accounts and records of the A-B-C Manufacturing Company—Manufacturers of brakes, brake bands, and brake lining—during the three months ended, March 31, 1919. The operating departments, manufacturing methods, and cost finding systems are as follows:

Operating Dep't	Mf'g Method	Cost Finding System
No. 1—Power		
No. 2—Weaving	Product method	Machine Cost
No. 3—Treating	Product method	Process Cost
No. 4—Brake	Special Order	Machine Cost
No. 5—Assembling	Special Order	Productive Labor Hours

General Operating Expenses are distributed on the basis of productive labor cost.

The following details cover the balances of the Ledgers at January 1, 1919, and the expenditures during the three months ended, March 31, 1919.

Balances of General Ledger at January 1, 1919.

	Dr.	Cr.
Cash	\$ 2,000.00	
Notes Receivable	25,000.00	
Accounts Receivable	81,000.00	
Factory Ledger	79,232.10	
Plant	100,000.00	
Vouchers Payable		\$ 11,215.10
Notes Payable		66,490.00
Reserve for Bad Debts		4,000.00
Reserve for Depreciation—Plant		9,300.00
Reserve for Discount		2,430.00
Capital Stock		175,000.00
Surplus		18,797.00
	<hr/>	<hr/>
	\$287,232.10	\$287,232.10

**Balances of Factory Ledger
at January 1, 1919.**

Raw Material:

Yarn—64,000 lbs. at 25c	\$16,000.00
Steel—54,000 lbs. at 33 $\frac{1}{3}$ c	18,000.00

\$34,000.00

Finished Stock—B	10,846.42
Finished Stock—B L	15,161.78
Finished Stock—B B	8,223.90
Department No. 1—Coal on hand	750.00
Department No. 2—Supplies on hand	3,675.00
Department No. 3—In process	3,175.00
Department No. 4—Supplies on hand	1,150.00
Department No. 5—In Process	2,250.00
Material	\$1,250.00
Direct Labor	750.00
Overhead	250.00
	<u>\$2,250.00</u>

General Ledger

Dr.	Cr.
\$34,000.00	

10,846.42
15,161.78
8,223.90
750.00
3,675.00
3,175.00
1,150.00
2,250.00

<u>\$79,232.10</u>	<u>\$79,232.10</u>
<u>\$79,232.10</u>	<u>\$79,232.10</u>

STATEMENT OF FACTORY EXPENDITURES DEPARTMENTAL AND GENERAL OPERATING

For the three months ended March 31st, 1919.

Particulars	Total	Departmental					General Operating Charges	
		General	Dep't 1	Dep't 2	Dep't 3	Dep't 4		Dep't 5
300,000 pounds yarn	\$75,000 00	\$75,000 00						
75,000 lbs. steel	25,000 00	25,000 00						
Direct labor	62,000 00		\$3,000 00	\$24,000 00	\$15,000 00	\$8,000 00	\$12,000 00	12,500 00
Indirect labor	24,000 00			4,000 00	3,000 00	2,000 00	2,500 00	2,000 00
Supplies	9,958 00		7,958 00					
Repairs and Maintenance—Labor	5,400 00		100 00	2,000 00	1,000 00	100 00	200 00	2,000 00
Repairs and Maintenance—Supplies	6,100 00		400 00	1,000 00	500 00	2,000 00	200 00	2,000 00
Fire and Liability Insurance	808 00		100 00	200 00	100 00	100 00	90 00	308 00
Factory Expenses	500 00							500 00
Stationery, Printing, Postage	2,000 00							2,000 00
Experimental—Labor	1,000 00							1,000 00
Experimental—Supplies	500 00							500 00
Freight, Express, Cartage	1,000 00							1,000 00
Totals	\$213,266 00	\$100,000 00	\$11,558 00	\$31,200 00	\$19,600 00	\$12,110 00	\$14,990 00	\$23,808 00

The distribution of General Operating charges is to be made upon the basis of the direct labor cost of each department.

**Details of Cash Receipts and Payments
for the 3 mos. ended March 31, 1919.**

Cash Receipts

From Accounts Receivable (Discount \$14,250.00)	\$460,750.00
From Notes Receivable	25,000.00
Total	<u>\$485,750.00</u>

Cash Payments

Vouchers Payable (Discount \$3,851.43)	124,529.67
Notes Payable	66,490.00
Pay Roll	91,000.00
Dividends	35,000.00
Advertising	65,000.00
Taxes	2,000.00
Telegraph & Telephone	700.00
Traveling Expenses	10,000.00
Salaries—Salesmen	20,000.00
Salesmen's Commissions	10,000.00
Salaries—General Office	18,000.00
Salaries—Officers	30,000.00
Legal Expense	2,000.00
Sundry Expenses	3,000.00
Total	<u>\$477,719.67</u>

All items in the statement of Factory Expenditures are to be credited to Vouchers Payable except that the total amount for labor is to be credited to "Pay Roll" in the General Ledger.

The following items, not included in Factory Expenditures, are to be credited to Accounts Payable and charged to appropriate accounts in the General Ledger:

Insurance	\$2,000.00
Stationery, Printing Postage	1,500.00
Freight, Express, Cartage	2,800.00

Charges for the following are to be provided for:—

Depreciation of Buildings & Machinery

8% per annum—Departments No. 1 and No. 4.

10% per annum—Departments No. 2, No. 3 and No. 5.

Interest on Capital—Buildings, Machinery & Equipment

6% per annum, on the valuation of each department.

For the purpose of arriving at the above stated charges, the Plant Account has been divided, as follows:

Departmental division of Plant

Plant	Total	Dept. No. 1	Dept. No. 2	Dept. No. 3	Dept. No. 4	Dept. No. 5
Buildings	\$53,000.00	\$12,000.00	\$15,000.00	\$10,000.00	\$12,000.00	\$4,000.00
Mach'y Tools and sprinkler system	47,000.00	8,000.00	20,000.00	15,000.00	3,000.00	1,000.00
	<u>\$100,000.00</u>	<u>\$20,000.00</u>	<u>\$35,000.00</u>	<u>\$25,000.00</u>	<u>\$15,000.00</u>	<u>\$5,000.00</u>

Distribution of General Operating Expenditures

Distribute the expenditures to Departments No. 1, No. 2, No. 3, No. 4, No. 5, according to the direct labor charged to each Department. The percentage to be used for the purpose, is approximately 38.4.

Details from the Power Department

Department	Horse-power used	Running time
No. 2	50	18,000 hrs.
No. 3	40	18,000 hrs.
No. 4	5	3,000 hrs.
No. 5	5	3,000 hrs.

The rate on total horse-power hours was .0081272.

Summary of Material Requisitions

Raw materials were delivered as follows:

To the Weaving Dep't—310,000 pounds of yarn.

To the Brake Dep't—81,000 pounds of steel.

Production of Weaving Department

297,000 pounds net of Brake Lining.

The waste of no value—amounted to 3,000 pounds.

A new rate was established for cost of yarn, viz.: 25 $\frac{1}{4}$ cents per pound.

The total running time of the machines was 18,000 hours, the charges for the period were \$52,805.48, the rate being approximately \$2.9336 per machine hour.

Taking into consideration the work in process at January 1, 1919—the total machine hours on production were 18,100, and the rate of \$2.9336 per hour was established.

From the above stated details, calculate and journalize the costs to show:

Material—Cost and rate

Operating Expenses—Cost and rate.

Cost of weaving—per pound, total cost, and rate.

Cost of weaving—Total transferred to the Treating Department.

Production of Treating Department

The production of the department was 298,000 pounds.

After passing through the department, five feet of Brake Lining are equal to one pound.

Details relating to the Treating Department

Inventory at March 31, 1919, was \$ 2,303.94

Cost of production was 33,082.64

In preparing the entries, summarize the foregoing details so as to show:

How the cost is obtained.

The cost per pound for Treating.

The cost per foot for Treating.

Total cost of Weaving and Treating, by pounds and feet.

Details relating to the Treating Department—Continued

1,400,000 feet at 10.817 cents per foot were transferred to Finished Stock—
B. L.
90,000 feet at 10.817 cents per foot were transferred to the Brake Department.
15,000 feet of Brake Lining were transferred from Finished Stock—B. L.
to the Brake Department.

Production of the Brake Department

Of Brakes	14,000
Of Brake Bands	16,000

In each Brake there are four pounds of steel, and three feet of Lining.
In each Brake Band there are $1\frac{1}{2}$ pounds of steel, and 3 feet of Lining.

Machine hours

On Brakes	18,000 hours
On Brake Bands	18,000 hours
	<hr/>
Total	36,000

The charges for the period were \$16,978.91.

The machine rate, therefore, was 47.163 cents per hour.

Journalize the stated details, so as to show the following separately for Brakes and for Brake Bands:

Weaving, Treating, and Steel Cost.
Brake Department Operating Cost.
Total Cost, and rate per Brake and Brake Band.
Rate for Brakes—47.163 cents per hour.
Rate for Brake Bands 47.163 cents per hour.

The total cost of production of the Brake Department is transferred to the Assembling Department, such cost being \$53,380.82.

From the details given show the following:

Cost of Treating.
Cost, and rate of Brakes.
Cost, and rate of Brake Bands.
Total production cost of Brakes.
Total production cost of Brake Bands.

Production of the Assembling Department

Of Brakes	14,100
Of Brake Bands	13,900

Journalize the following, to separately show the cost:

Department cost for Brakes	\$2.26423
Department cost for Brake Bands	1.3551
Department Direct labor for each.	
Department Operating expenses for each.	
Total cost of each.	
Rates for Brakes	\$2.94728
Rate for Brake Bands	2.04135

In process at March 31, 1919

Material	\$3,861.54
Labor	<u>1,750.00</u>
Total	<u>\$5,611.54</u>

Productive Labor hours

On Brakes	20,000 hours, average 30 cents per hour.
On Brake Bands	<u>25,000 hours, average 20 cents per hour.</u>
Total, labor hours	<u>45,000</u>

The total department charges for the period showed a labor hour rate of 18.1554 cents.

Summary of Sales and Cost of Sales

Sales	Cost of Sales
1,380,000 feet of Brake Lining at 20 cents per foot.	10.817 cents per foot.
16,000 Brakes at \$6.00 each	\$2.94728 each
16,500 Brake Bands, at \$5.25 each	\$2.04135 each

The Reserve for Bad Debts is to be adjusted so that the balance will equal 3% of the ending balance of the Accounts Receivable.

A Reserve for Discount is to be made, the net of which will about equal 3% of the balance of Accounts Receivable, and of Accounts Payable, at March 31, 1919.

Division of the Solution

The solution of the problem will probably, require more time than is available within the period devoted to a single lesson, we therefore apply the problem as lessons 27 and 28, the solution to be divided as follows:

Solution required, as lesson 27

- (1) The journal entries for General Journal and factory journal, necessary, for opening the general and factory ledgers at January 1, 1919.
- (2) The journal entries necessary to set up the reserve for depreciation in the general ledger, and the charges for depreciation in the factory ledger.
- (3) The Journal entries necessary to set up—in both ledgers—the charges for interest on Capital invested in Buildings, Machinery and Equipment.

Entries in the factory journal, and in the General Journal are to be separate, so that they may be collected in proper sequence for the entire problem.

Solution required as lesson No. 28

- (1) All necessary entries for completing the solution of the Problem.
- (2) Prepare and fill out the summarizing records, so that postings may be shown therefrom directly to the ledger accounts affected thereby.

The records required are:

Journal entries.
Ledger Accounts.
Register of Accounts Payable.

Solution Required as Lesson No. 28—Continued

One Stock Record, showing each classification. Ordinarily a separate Record would be required for each classification. A single Record, however, will suffice for the purposes of the problem.

Power Cost and Distribution.

Summary of Material Requisitions.

Pay Roll—Classified.

Summary of Sales & Costs.

Trial Balances of both Ledgers at March 31, 1919.

Profit & Loss Statement for the 3 mos. ended March 31, 1919.

Balance Sheet at March 31, 1919.

J. LEE NICHOLSON INSTITUTE OF COST ACCOUNTING

STANDARD BASIC COURSE

TWENTY-NINTH LESSON

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Chicago

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J. LEE NICHOLSON

TWENTY-NINTH LESSON

SUBJECT: GRAPHICAL PRESENTATION OF STATISTICAL INFORMATION.

The managers of present day industrial enterprises are confronted by a volume and complexity of problems which renders necessary prompt statistical information of every operation from the receipt of raw material to the collection of accounts due. Quick and correct decisions of policy are dependent upon statistical information relating to each element which tends to increase or decrease the profits of a business, from the costs of labor, material and overhead to far-reaching outside influences. By a careful study of statistical information, both regarding his own business and the business world in general, the executive can utilize the experience of today and yesterday and be aided in forecasting the future, using the result as an indicator of what he may expect to occur tomorrow in relation to his own business.

The business executive is called upon at every hour of the day to pass his judgment upon problems laid before him. Unless the problems are presented in accurate and concise form his decision is apt to be based on guess work rather than fact. In order to meet his needs the intricate problems that confront him should be analyzed, and condensed reports worked up in proper form and placed on his desk to provide an acceleration of his work.

The preparation of statistical information should begin with the executives in subordinate positions, who should prepare summaries of the details for which they are responsible. These summaries should be passed on to a higher executive who will combine his report with many others for which he is responsible, and pass the essential facts to the management. These summaries and reports should be assembled in as simple a form as possible in order that the manager may grasp the total of production, or expense, or sales, or collections. As he is concerned only with broad results, the figures at the end of the report must be accurate. If they appear unsatisfactory, he should be able to trace backward through the statistics and ascertain the deficiency.

Reports, however concise they may be, will reach the limit of their expressiveness in the use of language for the conveyance of facts. The statistical reports should be supplemented with an appeal to the eye by means of graphical charts of various kinds.

Graphic methods, providing their proportions are correct, present essential relationships at a glance. They enable the executive to base his opinion on facts. All along the line, as the reports have been compiled each subordinate has functioned as a cog in the wheel of organized thinking by summarizing the myriads of details in order that the essential facts may be brought to the attention of the chief executive.

The chief executive, in order to administer his business effectively should have before him at all times in graphical form the following:

1. Material costs, classified as to kinds.
2. Inventories, classified as to kinds.
3. Wastes, scrap, spoiled work, rejections, etc.
4. Labor turnover.

5. Overhead expenses, departmental and general.
6. Manufacturing costs.
7. Sales costs, classified as to lines.
8. Sales, orders, deliveries.
9. Profits and dividends.

In addition to the foregoing, the department head should prepare graphical charts by means of which the operations of his department will be shown in greater detail.

The sales manager can plot the total volume of his orders, can show the comparative territorial volumes, the various commodity volumes, and the revenues from the sales of each.

The purchasing agent can show the market price of certain materials or commodities and the amount used in the plant as an aid in placing orders.

The advertising manager by a graphical chart can show the inquiries and business secured through different advertisements and mediums.

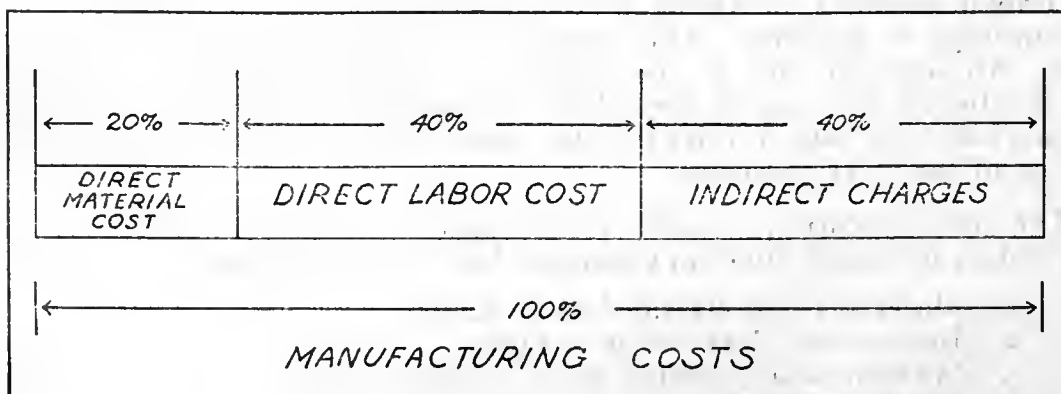
The production manager can stimulate the workmen to greater incentive by placing in a convenient place where all may see it, comparative symbols showing the production of today over yesterday.

The cost accountant with the facts and figures of manufacturing costs before him can present invaluable information to the chief executive. He can supplement his reports with clear and interesting graphical charts which will show quantitative facts in true proportions and give instantly the correct interpretation. Valuable figures might be laboriously prepared, yet they have little value unless studied as an aid to administrative guidance. A simple chart would convey the facts more quickly and accurately than the most elaborately written report.

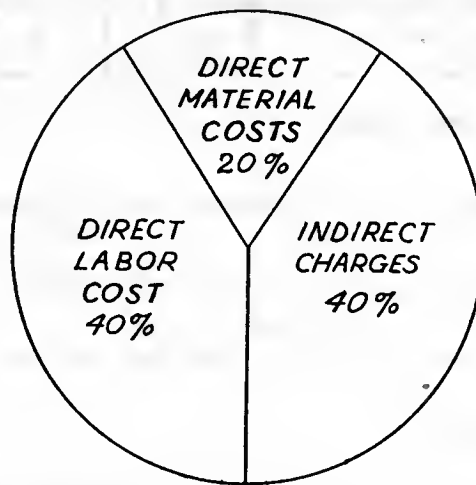
Kinds of Charts:

The horizontal bar is an especially good method of showing the component parts of a total. The total length of the bar represents 100%, and the various component elements of the total are shown as segments of the bar. For the purpose of illustration we will assume a hypothetical case as follows:

Direct Material Cost	\$100.00	20%
Direct Labor Cost	200.00	40%
Indirect Charges	200.00	40%
Manufacturing Costs	\$500.00	100%



The same information can be presented in the form of a circle, the total area of which represents 100%, and the elements of costs mentioned occupying segments of 20 per cent, 40 per cent, and 40 per cent respectively.



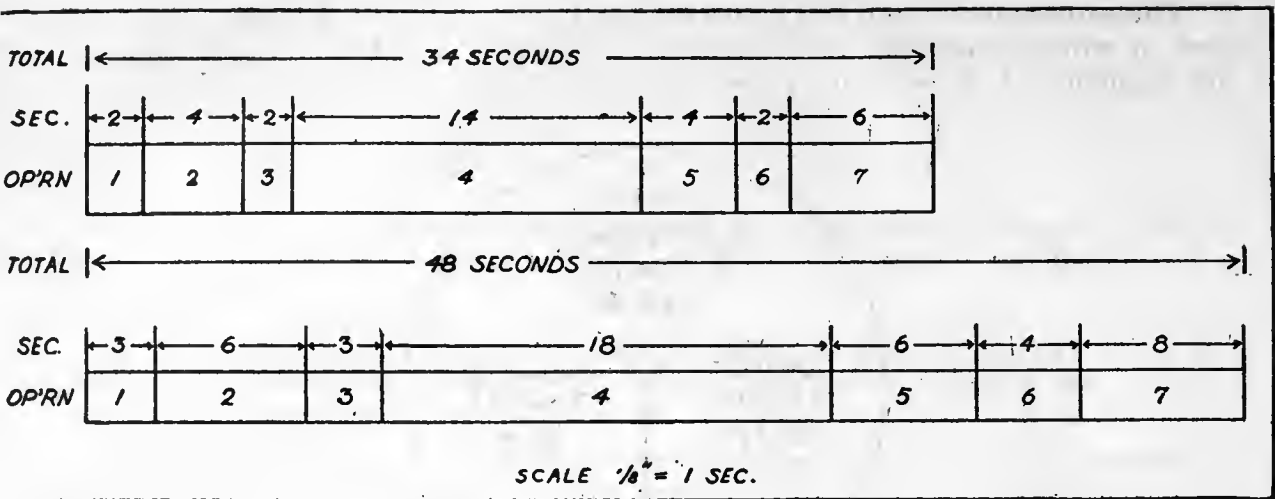
By dividing the surface of a circle into sectors, the constituent elements of a report may be shown in graphical form, but it is not a desirable form of presentation, however, because it does not have nearly such flexibility as the bar or straight line method.

The bar is also an excellent device for presenting relative time studies on operations. The quantity produced in a given time by different operators may be graphically represented in detail and comparisons made clearly showing the facts. A comparison may also be made of the relative time for the various operations performed by two or more workmen at the same machine or on the same jobs. By way of illustration we will assume the following time was spent in the various movements by two workmen on the same operation in the manufacture of handles:

- | | |
|------------|--|
| Movement 1 | Reaches for rough handle. |
| " 2 | Places in jig. |
| " 3 | Closes jig. |
| " 4 | Depresses handle against polishing belt. |
| " 5 | Raises jig. |
| " 6 | Opens jig. |
| " 7 | Extracts handle tossing it in tote box. |

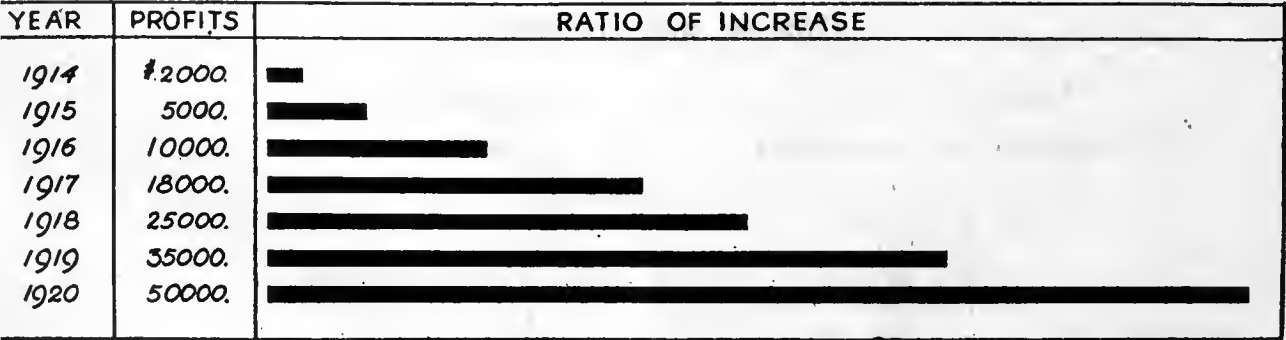
Time on each movement.

Workman No. 1				Workman No. 2			
Movement	1	2	seconds		3	seconds	
"	2	4	"		6	"	
"	3	2	"		3	"	
"	4	14	"		18	"	
"	5	4	"		6	"	
"	6	2	"		4	"	
"	7	6	"		8	"	
Total Time							
					34		48



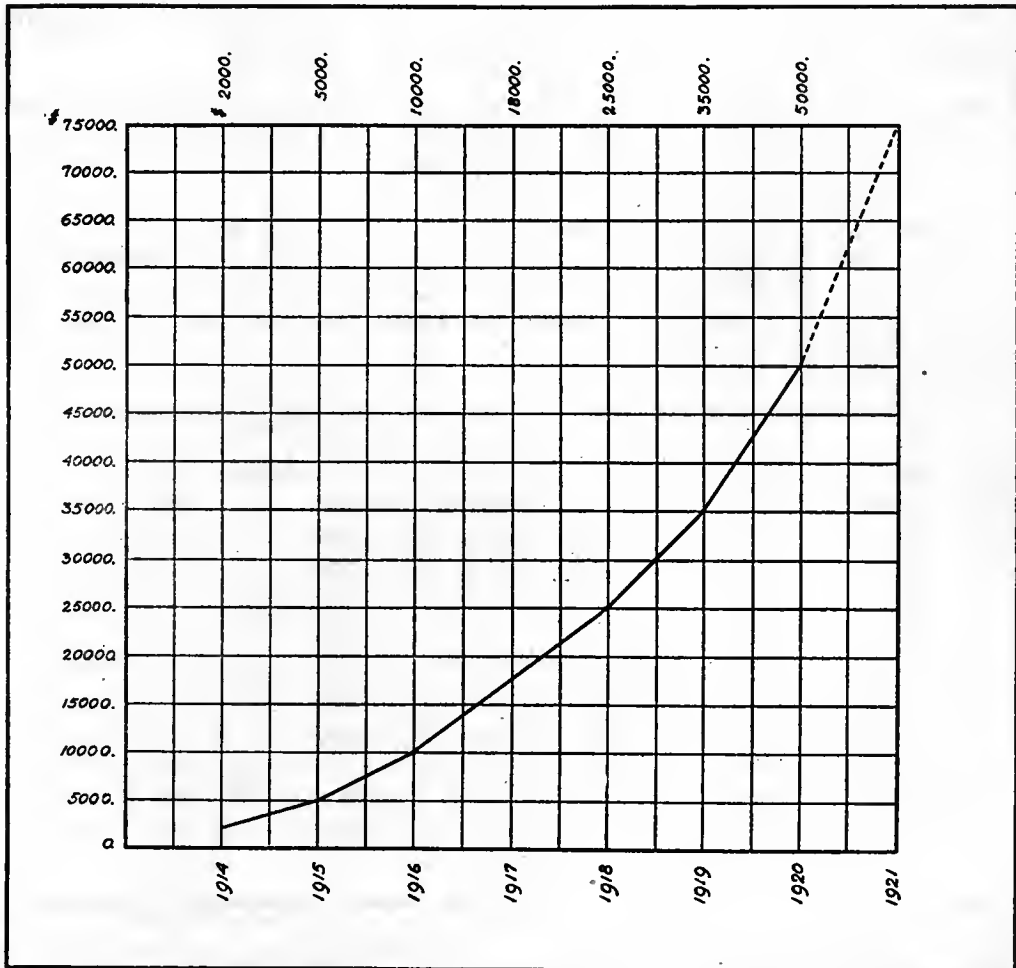
Another easily made and very effective means of expressing data is by the use of parallel, horizontal or vertical bars. Assuming it is desired to show in comparative form the net earnings of a profitable business over a period of years.

1914	\$ 2,000.00	Net Profits.
1915	5,000.00	" "
1916	10,000.00	" "
1917	18,000.00	" "
1918	25,000.00	" "
1919	35,000.00	" "
1920	50,000.00	" "



The Curve:

The graphical device most commonly employed in the presentation of statistical facts is the curve. An understanding of how to plot curves, and how to read them, should be part of the equipment of every business man, just as it is of every engineer, scientist or statistician. The general scheme of curve plotting is very simple, as will readily be seen by constructing a curve from the figures used in the last illustration.



In the above figure each year is represented by vertical lines. Horizontal lines were drawn for each \$5,000.00 of sales. After the background ruling has been drawn, the figures for each year are laid off to scale, on the proper vertical lines to represent business years, and a dot is placed on each vertical line at that vertical distance which represents the data according to the scale drawn. Thus the figure \$2,000.00 would be indicated as a dot on the vertical line for 1914 slightly below the place where the horizontal scale line for \$5,000.00 crosses the chart. After the dots for business years have been placed on the vertical lines, the dots are joined with a heavy line and a curve is made.

It will be noticed that figures are given at the top of the chart to represent the value for each point plotted on the curve. This information is desirable for anyone who wishes to know the value of any point on the curve, as he may look above the point and get the actual figure wanted, without having to read from the scale to the left hand edge and then estimate roughly the value

of any point which happens to fall in a space between two horizontal lines of the scale.

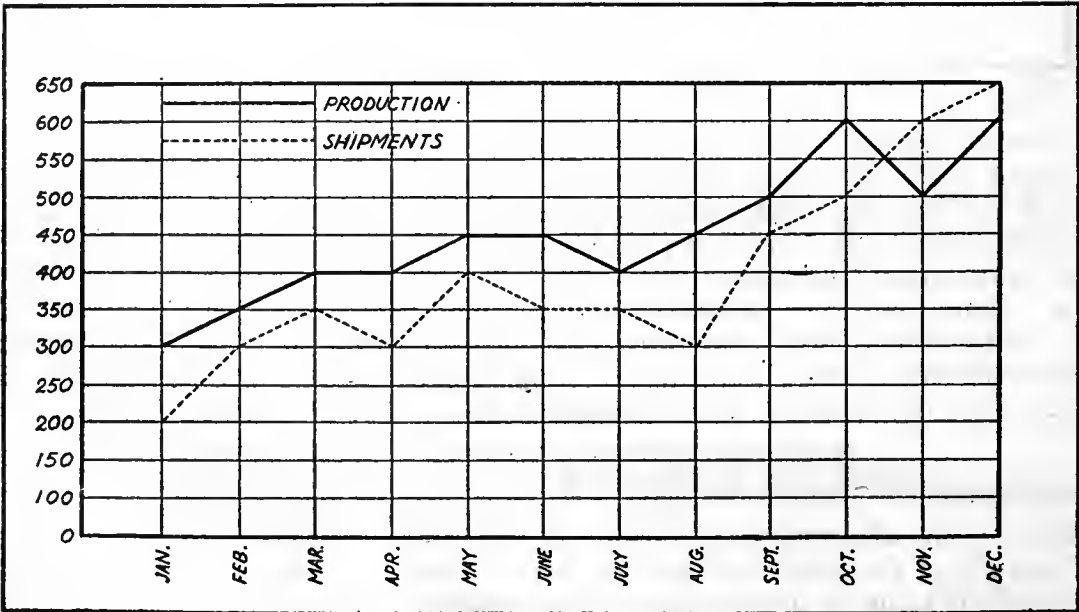
It is reasonable to suppose where there is a uniform increase year after year in the figures, as is the case in the above illustration, that the same general average will be maintained. Expectations of this nature may be noted on the chart by extending the heavy line until it crosses the vertical line representing the next year. Extensions of this character are made by dots or dashes and denote what may be expected of the future.

A curve permits of a finer interpretation than any other known method for presenting figures for analysis in comparative form.

By means of the curve the cost accountant can present the data concerning several related elements, all of which are brought out more clearly in their relation one to the other by graphic presentation.

The relation between the total production of a certain article and the shipments can be charted over a period to show the investment in finished goods. This information is very important from a financial standpoint, as it is desirable to have as little money as possible tied up in inventory. Assuming the following figures for one year.

Production			Shipments		
January	300	Units	200	Units	
February	350	"	300	"	
March	400	"	350	"	
April	400	"	300	"	
May	450	"	400	"	
June	450	"	350	"	
July	400	"	350	"	
August	45	"	300	"	
September	500	"	450	"	
October	600	"	500	"	
November	500	"	600	"	
December	600	"	650	"	



Fluctuations in the unit cost of direct materials, direct labor and indirect charges for different cost periods can be vividly portrayed by the curve. Assuming the following figures represent the unit cost of an article produced each month for a period of twelve months.

	Direct Materials	Direct Labor	Indirect Charges	Total Unit Cost
January	\$27.00	\$13.00	\$15.00	\$55.00
February	25.00	12.00	15.00	52.00
March	30.00	11.00	15.00	56.00
April	30.00	12.00	18.00	60.00
May	32.00	13.00	18.00	63.00
June	35.00	14.00	17.00	66.00
July	37.00	15.00	16.00	68.00
August	35.00	16.00	19.00	70.00
September	32.00	17.00	20.00	69.00
October	30.00	15.00	19.00	64.00
November	28.00	12.00	16.00	56.00
December	25.00	9.00	11.00	45.00

Before a chart can be made, the data which it will represent must be collected and tabulated. The cost accountant will have many sources to which he may turn for facts, all of which must be compiled and the correct figures determined before graphical presentation can be made. It is necessary that the arithmetical accuracy of these figures be unquestionable. Incorrect calculations will be reflected on the chart, and much time and labor will be wasted by attempting to graphically present incorrect figures from which erroneous decisions of policy are apt to result.

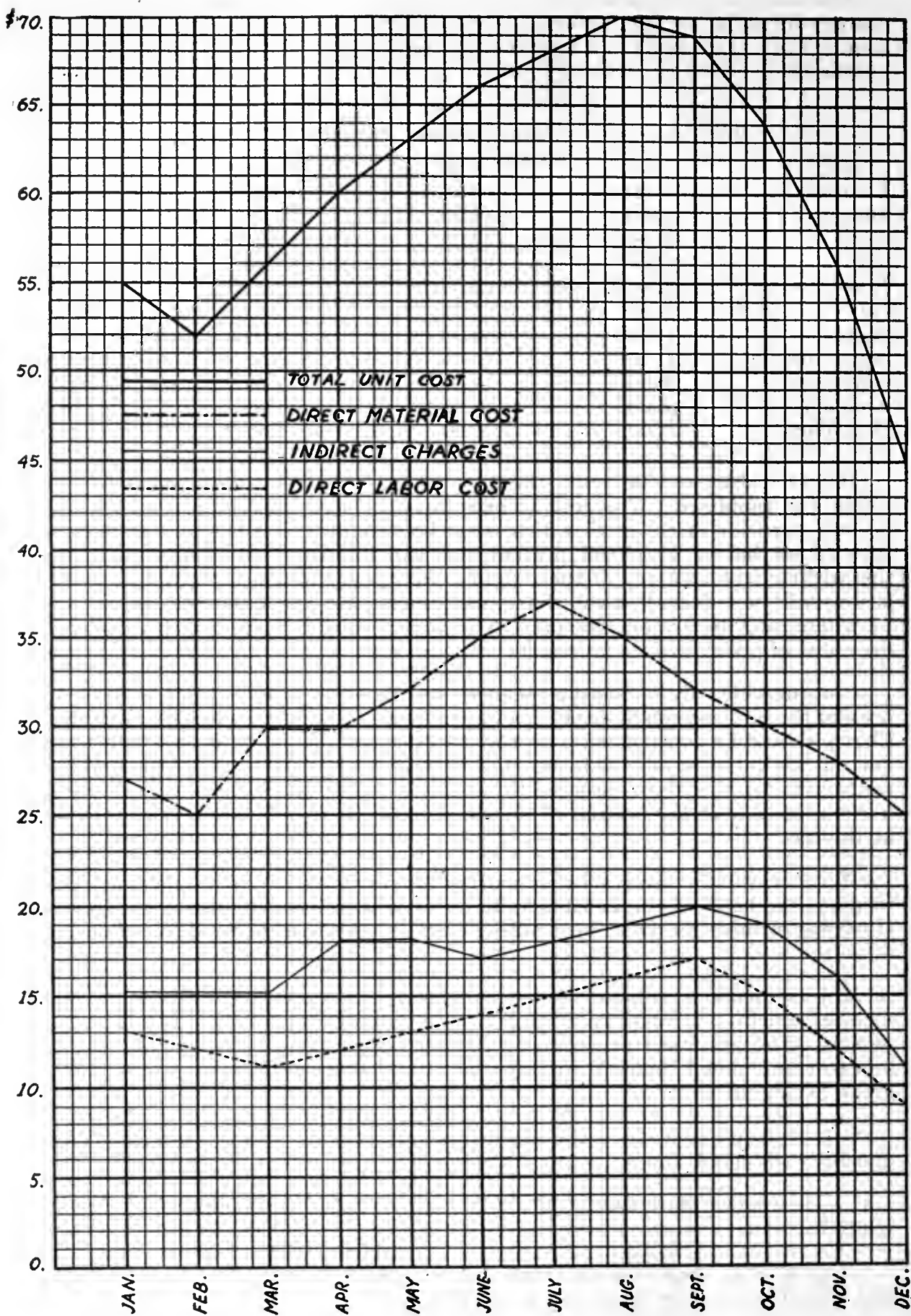
Considerable care should be taken to see that the chart is drawn so as to present the information desired in as logical and as simple a manner as possible. Charts should be constructed with the idea in view of having them easily read and quickly interpreted. This may be accomplished by having the general arrangement of the chart proceed from left to right placing the figures for a horizontal scale at the bottom of the chart, and the figures for a vertical scale at the left.

A chart should always be supported by exhibits of the numerical data forming the basis of the construction. This will enable the executive to more closely scrutinize the facts by readily referring to those parts demanding his attention.

The tremendous amount of matter relating to commerce, accounting and finance which is printed every day cannot possibly be read by the average person. The graphical presentation of these quantitative facts would enable him to comprehend them at a glance, resulting in accuracy of thought and a great saving of time.

In constructing a chart the student should be governed by a few rules, generally accepted among engineers for graphic presentation of facts:

1. The earliest date should be shown at the top when columns of figures relate to same.
2. Generally, the horizontal scale for curves should read from left to right and the vertical scale from top to bottom.



3. When arithmetically ruled paper is used the vertical scale whenever possible, should be so selected that the zero line will show on the chart.

4. The zero line for a vertical scale should be much broader than the average co-ordinate lines.

5. When the zero line cannot be shown on the bottom of a chart, the bottom line should be drawn slightly wavy to show that the field has been broken off and does not reach zero.

6. Broad lines should be drawn to represent the point for percentages, zero lines, and time.

7. Co-ordinate lines should be very light ruling but the curve should be very heavily ruled.

8. Figures may be shown at the top representing the value of each point plotted on a curve, if there are not too many curves in one field.

9. If figures are given at the top they should be added to show the yearly or other totals. This information will be useful in reading.

10. A clear and descriptive title should be given to each chart.

11. Do not overcrowd the chart with too many different curves.

A chart constructed with a great amount of detail is difficult to interpret. The most important facts should be brought out and the detail should be shown in tabulated form as supporting exhibits.

Whenever possible the chart should show comparative figures and percentages of the current period with

(a) The preceding period.

(b) The cumulative figures for the current year.

(c) The preceding year.

Comparative figures and percentages can be prepared for the Balance Sheet, The Profit and Loss Statement, The Manufacturing Statement, and all subsidiary exhibits of costs and be attached to reports as supporting exhibits.

In securing for himself the maximum benefits to be derived from graphic methods, the executive has at his command several different mediums or devices.

Maps are commonly used by sales managers to show the volume of distribution of his product, or the location of branch houses or agencies, value of sales, prospects, or any information to which this method of presentation could be adapted.

Control boards are especially adapted to keeping a check upon the progress of work. If the various processes or operations can be separated, a board can easily be made to record the completion of each. Where several hundred orders or contracts are in process at the same time a control board will enable the manager to determine instantly the exact condition of any order or contract.

As a means for instructing the employees of the cost department, and the employees of other departments who are brought in contact with the detailed working of the cost system, a chart in the form of the following illustration would prove to be of great advantage:

CHART OF A SPECIAL ORDER SYSTEM

GENERAL DESCRIPTION OF ENTRIES	METHOD OF CONTROL OF COST RECORDS			GENERAL LEDGER ACCOUNTS AFFECTED
	DETAILED RECORDS AND FINAL STATEMENTS	POSTING MEDIUM	FACTORY LEDGER ACCOUNTS AFFECTED	
AUTHORIZATION AND PURCHASE OF MATERIALS AND SUPPLIES AND INCURRING OTHER EXPENDITURES.	<pre> graph TD PR[PURCHASE REQUISITION PURCHASE ORDER] --> INV[INVOICE] INV --> APV[ACCOUNTS PAYABLE VOUCHER] APV --> RA[REGISTER OF ACCOUNTS PAYABLE] </pre>	REGISTER OF ACCOUNTS PAYABLE AND ACCOUNTS PAYABLE VOUCHER	DR. RAW MATERIAL AND SUPPLIES DR. DIRECT LABOR DR. INDIRECT EXPENSE	DR. FACTORY ACCOUNT CR. ACCOUNTS PAYABLE
RECEIVING, STORING AND REQUISITIONING RAW MATERIALS AND SUPPLIES.	<pre> graph TD RMR[REPORT OF MATERIAL RECEIVED] --> RSR[RAW STOCK RECORD] RSR --> MR[MATERIAL REQUISITION] </pre>			
RAW MATERIAL AND SUPPLIES PUT INTO OPERATION.	<pre> graph TD RMD[RECORD OF MATERIAL DELIVERED] --> PCR[PROCESS CARD RECORD] RMD --> PC[POWER COSTS AND DISTRIBUTION] RMD --> AF[ANALYSIS OF FACTORY EXPENDITURES] </pre>	REPORT OF MATERIAL DELIVERED	DR. WORK IN PROCESS DR. PROCESS COSTS DR. POWER COSTS CR. RAW MATERIALS AND SUPPLIES	
COMPILED OF COST DATA ON COST SHEET: (1) CHARGING RAW MATERIAL AND SUPPLIES. (2) CHARGING PRODUCTIVE LABOR COST AND TIME. (3) ANALYZING AND CHARGING INDIRECT EXPENSES (4) COMPILED AND DISTRIBUTION OF POWER COSTS (5) COMPILED AND DISTRIBUTION OF PROCESS COSTS	<pre> graph TD PO[PRODUCTION ORDER AND COST SHEET] --> TR[TIME REPORT] TR --> PR[PAY-ROLL] PR --> FSR[FINISHED STOCK RECORD] </pre>	TIME REPORTS SUMMARY ANALYSIS OF FACTORY EXPENDITURES POWER COSTS & DISTRIBUTION SUMMARY PROCESS CARD RECORD SUMMARY	DR. PROCESS COSTS DR. POWER COSTS CR. DIRECT LABOR DR. PROCESS COSTS DR. POWER COSTS CR. INDIRECT EXPENSE DR. CR. POWER COSTS DR. WORK IN PROCESS CR. PROCESS COSTS	
TRANSFER OF FINISHED PARTS AND FINISHED STOCK RECORD TO THE STOCK RECORD TRANSFER OF FINISHED PARTS INTO OPERATIONS	<pre> graph TD FSR[FINISHED STOCK RECORD] --> PFSR[PART FINISHED STOCK RECORD] PFSR --> SBO[SHIPPING AND BILLING ORDER] SBO --> CC[CREDIT CERTIFICATE] </pre>	SUMMARY OF PRODUCTION ORDERS AND COST SHEETS OF FINISHED ORDERS OR FINISHED PARTS. SUMMARY OF PRODUCTION ORDERS AND COST SHEETS OF FINISHED PARTS TO BE COMPLETED.	DR. FINISHED STOCK DR. PART FINISHED STOCK CR. WORK IN PROCESS DR. WORK IN PROCESS CR. PART FINISHED STOCK	DR. SALES CLASSIFICATIONS CR. FACTORY ACCOUNTS
SHIPMENT AND SALE OF FINISHED STOCK OR PART FINISHED STOCK. RETURN OF FINISHED STOCK OR PART FINISHED STOCK. ENTRIES UPON REGISTER OF SALES AND COSTS.	<pre> graph TD SBO[SHIPPING AND BILLING ORDER] --> RSC[REGISTER OF SALES AND COSTS] RSC --> BS[BALANCE SHEET] </pre>	REGISTER OF SALES AND COSTS		
FINAL STATEMENT	<pre> graph TD SPL[STATEMENT OF PROFIT AND LOSS] --> BS[BALANCE SHEET] </pre>	STATEMENT OF PROFIT AND LOSS		
		STATEMENT OF PROFIT AND LOSS AND BALANCE SHEET ARE PREPARED FROM THE ACCOUNTS IN THE GENERAL AND FACTORY LEDGERS		

- (1) The "Purchase Requisition" which shows the materials and supplies required.
- (2) The "Purchase Order" which is sent to the creditor, ordering the necessary materials and supplies.
- (3) The "Invoice" which is checked when received with the purchase order and also with the report of material received.
- (4) The "Accounts Payable Voucher" used for the purpose of classifying the expenditures preparatory to their entry on the "Register of Accounts Payable."

These are followed by the forms necessary for recording, receiving, storing and requisitioning of raw materials and supplies put in operation.

- (1) The "Report of Material Received," which after being verified with the purchase order, is entered on.
- (2) The "Raw Stock Record"—unless the material is entered directly upon the cost sheet of a particular order.
- (3) The "Material Requisition" which shows the raw materials required for a certain order.

The "Report of Material Delivered" is used to show the raw materials and supplies put in operation. The information relating to raw material is transferred to the "Production Order and Cost Sheet" while the information relating to supplies is transferred to either the "Process Card Record" or the "Power Cost and Distribution" record.

The compilation of the cost data is made upon the production order and cost sheet. The information for the material charged is obtained from the report of material delivered and the information for the labor and indirect expense charges is obtained from the process card record, together with the Time Reports, which show the productive labor time upon each particular order.

The productive labor cost is transferred to the process card records or the power cost and distribution records from the time reports, which are summarized upon the payroll for payroll purposes and entered upon the accounts payable voucher.

The information for the analysis of factory expenditures is obtained from the Accounts Payable Voucher, and is transferred to either the power costs and distribution records or the process card records. Later, all information on the power cost and distribution records is transferred to the process card records. The cost of finished stock orders or finished parts is transferred to their respective stock records; and in case any finished parts are put back into operation for completion, the cost of such parts is transferred to the cost sheet. When finished parts or finished stock are shipped the stock records are credited, entries being made upon the "Register of Sales and Costs" from the duplicate of the bill or shipping order.

When merchandise is returned by a customer, a report of material received is made out, which supplies the data for (1), the "credit certificate," (2) transferring such merchandise back into either part finished or finished stock, and (3) making the proper entry upon the Register of Sales and Costs.

Organization Charts:

The business executive can see his office equipment and his employees, but he cannot see the organization itself by its physical appearance alone. An

organization chart outlining both individuals and functions with specific instructions as to responsibility should be prepared for every business that is not stripped for action, tuned up, snugly fitted to the job, and departmentalized in keen relation to functional sub-division.

An organization chart should be prepared for the entire business, clearly defining the duties and responsibilities of each officer and employee and those of his co-workers with whom he comes in official contact. Supplementary charts may be prepared for each department more definitely and decisively fixing both authority and responsibility of the personnel.

An organization properly graphed will mold men, money and materials into hard hitting units by:

- (a) Clearly defining the duties of each worker.
- (b) Allocating responsibility by placing workers in charge of specific duties under the direction of a superior.
- (c) Eliminating duplication of the work of one group of workers by any other group.
- (d) Functioning the work of one group of workers with that of co-related groups.
- (e) Assigning workers to the jobs they are best qualified to perform.

QUESTIONS FORMING THE TWENTY-NINTH EXAMINATION.

1. In some cases, statistical details may be more effectively exhibited by means of Graphic Charts. In other cases the details may be more effectively exhibited by presenting them in statement form. State, in a general way, the limitations of each method for effective presentation, and give your reasons therefor.
2. State, briefly but concisely, your understanding of the dominant purpose of detailed information, which is required by an executive, and the reasons which render it important.
3. In view of your answer to question No. 2, do you consider a graphic presentation as ordinarily sufficient to meet the requirements of an executive? Give reasons.
4. What do you consider the foremost commending feature of a graphic presentation to be, and what is its prime requisite?
5. Labor Turnover is referred to in the lesson, as a fitting subject for graphic presentation. Assuming that you desired to exhibit the effect of Labor Turnover upon volume of production, and also to exhibit the cost of Labor Turnover, what details would you endeavor to exhibit?
6. Accuracy and simplicity are prime essentials in determining the most effective method for graphical illustration. When the results to be exhibited favor the use of horizontal or vertical parallel bars, or the circle, why should preference be given to the former?
7. In constructing a graphic chart for the purpose of exhibiting comparisons, what comparative periods do you consider to be ordinarily required?
8. A Cost System involves the use of numerous forms and records, which bear an orderly relation one to the other. What do you consider is the prime advantage of a chart which illustrates the working of a cost system?

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STANDARD BASIC COURSE

THIRTIETH LESSON

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THIRTIETH LESSON

Final Examination.

Conditions: Written answers are to be given to each and all of the questions, in the order in which the questions appear.

Questions are not to be repeated. It will suffice to prefix each answer with the number of the question to which it relates.

All questions relate to Factory Cost Accounting.

1. Name 5 detailed reports which would usually be required for recording material costs.
2. If the machinery of a plant is valued at \$50,000.00 and its life is estimated to be 13 years, with a final scrap value of \$1,250.00, what annual rate would you use for the purpose of providing depreciation?
3. Give a formula which expresses the method of arriving at a machine rate (when a machine rate is used) for charging direct labor and machine overhead to the product operated upon by a machine.
4. If there are several classifications of raw materials, finished product, stock of finished parts, or part finished stock, is it absolutely necessary to provide accounts upon the factory ledger for each classification? Is there any advantage in doing so? Give reasons.
5. Briefly explain the purposes of the following:
 - (a) Defective Work Report.
 - (b) Over, Short and Damage Account.
 - (c) Bill of Materials.
 - (d) Pay Roll Analysis.
 - (e) Special Order Cost System.
 - (f) Process or Product Cost System.
6. Referring to reports received from the factory, briefly explain in a general way:

The means by which a missing report would be brought to notice.
What disposition is made of the costs shown upon the reports?
How are the costs proved at the end of a cost period?
7. State the principal considerations which would influence you in determining the form of labor reports for use in a factory, and what should be the ultimate purpose of the report.
8. State and briefly describe, the records which show the supporting details for each total of the undermentioned factory ledger accounts which control the records in question:
 - (a) Raw Materials and Supplies.
 - (b) Work in Process.
 - (c) Finished Stock.
 - (d) Part Finished Stock.

9. Prepare factory Journal entries (without using figures), which will account for the following details at the end of a cost period, the details being shown on various summarizing records:

Raw Materials and Supplies used.

Finished Product transferred from the Factory to the Stores.

Cost of Sales.

Expenditures for the factory pay roll and for factory indirect expenses were paid at the general office, and advised therefrom to the office of the cost department.

10. Design a form of cost sheet which you think would suffice for showing the costs of a special order involving two distinct operations.
11. Design a form of Cost Sheet which would suffice to show the average unit cost of four products manufactured for stock, to be sold from stock.
12. From the following details, distribute the power costs to Departments A, B, C:

Total power costs \$1,806.00.

Machine records show:

In Department A.	Horse Power	Operating Hours
Machine A ₁	5	4000
" A ₂	8	4500
" A ₃	7	3500
In Department B.		
Machine B ₁	6	4000
" B ₂	4	3500
In Department C.		
Machine C ₁	8	5000
" C ₂	3	4500

